INDUSTRIAL MEDICINE AND SURGERY

INDUSTRIAL MEDICINE

The Journal of Medicine in Industry

This Journal is dedicated to the advancement of sound industrial medicine, including the surgery of industrial trauma. To that end its varying contents will embrace scientific papers, reports, digests, news items and official statements, together with editorial comment. The editorial policy is to avoid undue censorship. Some contributions ably prepared will be published although contravening the personal opinions of the editors. Care will be exercised in checking the accuracy of known facts, as printed, but in all other respects statements and opinions are those of the author and may not be shared by the editors. On any article, the editors reserve the right to comment favorably or otherwise, in the current or any subsequent issue. On this basis, contributions are invited. The opinions expressed in any contributions, including the editorials of this Journal, do not necessarily reflect the attitude or opinions of any associated organization.

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FEBRUARY, 1957

Employee and Student Health Services at University Medical Centers

A Preliminary Report of the University of Oklahoma Medical Center Workshop

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TRADITIONALLY viewed as educational and charitable institutions, medical schools, and their companion university hospitals only recently have been considered to have some of the characteristics of industrial plants. Because of large numbers of students and employees, a broad representation of many job families, and the presence of occupational health hazards, the similarity is not wholly theoretic. Although Student Health Services have existed for years at undergraduate campuses, the establishment of such facilities at university Medical Centers has been relatively recent.

Descriptions of case finding efforts have been encountered, but no formal effort at delineating the problems of this kind of medical unit has been initiated. Because of the growing interest in the well-being of the student and the employee on the medical campus, it was believed desirable that an exploratory Workshop be held to review the development, structure, and utilization of such services. With the imbedding of benchmarks, future action relating to needs, total experience inventories, and research, could follow.

Invitations to join a two-day Workshop were sent to all medical schools in the United States, and 33 replies connoting interest were received. Of these, 15 universities sent 18 representatives; 18 expressed regrets in being unable to share in the proposed conference but wished to be acquainted with the results, and 48 schools failed to answer.

On March 27 and 28, 1956, a Workshop was held at the University of Oklahoma Medical Center to survey the problem. Employing the permissive milieu of the group discussion method, ideas were exchanged, strengths and weaknesses examined, and plans were made for an investigation of current practices in teaching Medical Centers. The concepts and interpretations to follow are the results of the thinking of the attendants only, and may be at great variance with the beliefs of those not present.

What Is a Health Service?

FOR PRODUCTIVE rumination to take place, a baseline of understanding is needed, and a definition was sought. This seemed to satisfy most in the group: *A Health Service is an organization within an institution devoted to some degree of*

preventive medical care, health promotion, counseling, direct medical care, and research, which is practiced on a selective group of participants, and maintains high standards, with implications of good public relations and employee fringe benefits. The extent of the medical care rendered will depend upon local philosophy, the state of preparedness of the clientele group and others directly or indirectly concerned, but ultimately upon the concepts of such a facility.

Who Are the Recipients of the Service?

IN MOST university Medical Centers, several of these groups will participate in the program: students of clinical technology, dentistry, dietetics, hospital administration, medical social service, medicine, nursing, occupational therapy, pharmacy, physical therapy, x-ray technology, graduate students in the medical sciences, practical nursing students, medical record librarian students, nurse anesthetist students, nursing aide students, students in nursing affiliation, and members of the house staff; employees of these schools, hospitals, or Centers; members of the faculties; employees of research institutes, or special facilities considered part of the Medical Center; and, in some instances, volunteers rendering periodic service.

The presence of these persons, however, does not imply their universal inclusion in health service benefits. Some departments see only students, some provide care for employees also, and, in rare instances, some have separate facilities for these two groups. A few regard employees as unnecessarily burdensome to the traditionally student-oriented services, while in others the program is extended to all in equal apportionment. In one school, dependents of both the students and the faculty receive medical attention. Several of those Centers now seeing students only, were planning actively for the inclusion of employees on essentially the same basis of eligibility.

Is This Industrial or College Health?

THE identification of the Service with industrial health or college health was determined, it seemed, by one of several factors. When the undergraduate and graduate campuses are one, ordinarily a single Health Service exists which is patterned after the college Health Service design. In a split situation—with undergraduate students at one location, and medical and paramedical students on a separate campus (Medical Center) — the department for the Center may assume the setting of a college Health Service, or, more rarely, duplicate an industrial health department. This is particularly so where emphasis is given to teaching of occupational medicine and the Health Service is used for some of that instruction. In a few large universities where many component schools and colleges are located on a single campus, facilities with an active interest in occupational health have sprung up, and several staff members have been added whose disciplines encompass industrial hygiene or health-physics. These services are rendered to faculty, employees, and students, wherever an occupational health hazard exists and precautionary clinical and environmental control measures are needed.

In those areas where the wage structure is minimally scaled, greater latitude will exist in the inclusion of employees in the Service. When a Center adopts more of the administrative methods of industry, the Health Service will offer a program to the employees as a fringe benefit — in keeping with contemporary personnel relations practices — and the figure of an industrial health unit is given substance.

Services for Students

ENTRY PHYSICAL EXAMINATIONS: It seems common practice to require the report of a physical examination of all students seeking admission to a professional or graduate school. This most frequently is accomplished outside the university by the physician of the applicant's choice, or by the undergraduate campus Health Service, or on occasion by the Health Service of the Medical Center. This examination, it is recognized, might be a current re-assessment of the candidate's health status, or a transcription of data from a former set of findings, or form-completion without benefit of a new examination. Rarely does an appraisal of the examinee's emotional status accompany the report, even though the physician might have known his patient for years.

Considerable discussion centered around the value of these pre-entry physical examinations. It was felt that when the report was forwarded by the examining physician to the Health Service physician, and not via the Registrar, the more valid were the data. The question that arises is: Should the Health Service make information available to the Admission Committee, when certain pertinent findings or statements are encountered? Ordinarily, the report of the physical examination does not determine an applicant's acceptance for medical school. Some Committees ask the Health Service if any detrimental findings were encountered, and, in other instances, the Health Service apprises the Committee of certain items that might predict academic difficulty for the student.

The consensus was that admission should be determined without reference to the physical examination report. The view of the group regarding the worth of the pre-entry examination was a skeptical one, many feeling this procedure to be totally without value.

At this point the subject of the physically handicapped applicant to medical school presented itself. Several students in wheel chairs were en-

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rolled in various schools, and, surprisingly enough, little in the form of extra consideration was asked by these students. They were able to meet requirements, and it was felt that their being physically limited was insufficient reason for not permitting them to continue their education, if they had the intellectual capacity to do so.

With the beginning of the first year in medical or nursing school, the entering class might be examined in the Health Service, or the preentry physical examination might suffice. One Medical Center utilizes the full-time faculty members of the Department of Medicine in the examination program, which allows an unhurried thorough procedure, and serves as a teaching example of the correct method of examining the well person. Coupled with a battery of psychologic tests and a review of all the findings, the undertaking initiates a good relationship with the Health Service. The Cornell Medical Index Health Questionnaire has seen use in some localities, and its merit lies in identifying areas of concern frequently not reached by the history obtained verbally. Nearly all schools require entrance chest films as the initial step in a tuberculosis control program.

PERIODIC EXAMINATIONS: Practice was divided as to the frequency with which repeat examinations were to be conducted. Some installations reexamine annually, utilizing members of the resident staff who are paid by the hour for this function, and seem to enjoy it. Other institutions forego a repeat examination until early in the fourth year when reports of health status are required as part of the internship application. The care with which these and other periodic examination forms were completed was questioned, for some examiners utilized information already present in the clinical record, and others would examine anew. If the Health Service considers itself to be the student's physician, then such matters as these become part of the service offered. If the student has his own physician, then this practitioner assumes these matters along with other features of medical care.

EXTENT OF MEDICAL CARE: There was wide variation in the dimension of the care offered. No standardization of student health fees was encountered, and the costs to the student depended upon tradition, recognition of rising costs of hospitalization, willingness of the faculty to participate, and in rare instances were established by the state legislature. Fees varied from $4.00 to $30.00 per year for medical students, and occasionally, student nurses paid comparable fees.

Emergency care is rendered by all, but policies differ as to the extent of care for elective or static conditions. Some render no care for pre-existing conditions unless in-patient services are required, and these may be covered by a hospitalization insurance plan. Medical students, perhaps more than any other group, present "seasonal" illnesses, determined by the content of their current lectures. The first-year class, with its blooming awareness of things medical, frequents the Health Service more than the later years.

Student nurses present a broader selection of ailments, experience depicted. Younger as a rule, they still show some of the unresolved conflicts of late adolescence, and when thrown in contact with authority figures, may find adjustment difficult. The swing away from rigidity and inflexibility, in the activities permitted students, shows recognition of the problem. The tuberculosis control program, in some instances, sees chest fims taken quarterly on student nurses rather than semiannually as for medical students. Student nurses make a greater number of visits than do medical students, and both groups tend to level off in their visit frequency at the end of the second year.

Policies vary as to the double duty served by the Health Service physician. When a student is hospitalized, who becomes the physician in charge? Circumstances will determine this variation in the care pattern. In some campuses, particularly where an "infirmary" exists as part of the Health Service for all students — undergraduate and graduate — the physician in the Service shifts from deskside to bedside. In other loci, the student is transferred to a specific service in the university hospital, and care is rendered by the currently attending physician, ordinarily a member of the full-time staff, and, at discharge, summaries are forwarded to the Health Service. This applies particularly where the Health Service has assumed an industrial medical configuration, and where, by standard practice, definitive care is rendered outside the Service—when the condition exceeds the bounds of a preventive medical program.

Costs are of importance to the student, and, ordinarily, medications will be furnished him through the university hospital pharmacy at cost, or will be included as part of the service covered by the fee, unless the items are expensive vitamin or cosmetic preparations.

HOSPITALIZATION INSURANCE PROGRAMS: Of concern now is the prepaying of hospitalization costs for students. Some schools have utilized Blue Cross and Blue Shield plans on a voluntary basis, but were the schools to provide this, and carry the full cost, fees would have to be increased. In a few Medical Centers it was the experience that the Blue Cross had collected in premiums as much as three times the hospitalization costs among the insured student groups. As the Blue Cross plan adheres to a "standard" experience pattern, the hospitalization needs of a student group, in a Medical Center with a Health Service, are viewed out of proportion to the usage figures. Other underwriters can provide a combined policy of hospitalization and surgical

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fee indemnification, at less than the Blue Cross charge alone.

This is the area of greatest need in future exploration, for some of the current schemes of providing students with a specific number of days of hospitalization at no charge are unrealistic. The thinking is turning to a fuller outside insurance underwriting of the student groups.

IMMUNIZATION PROGRAM: An immunization effort is considered a primary function of the Health Service. Whether the obtaining of immunizing injections is done voluntarily or under a compulsory system depends upon local semantics. Several schools preferring the term "voluntary," adopt a tongue-in-cheek approach as the student is pursued avidly with the readied needle. It is not compulsory, but the "volunteering" is essentially of military styling.

Customarily given are smallpox vaccine, tetanus toxoid, typhoid vaccine, and diphtheria toxoid. On a voluntary basis, influenza vaccine, poliomyelitis vaccine, and BCG will be offered, and schools, in areas where it is needed, will give Rocky Mountain Spotted Fever vaccine.

PROBLEMS IN STUDENT ADJUSTMENT: Keenly aware of emotional difficulties experienced by students, the directors of the Health Services had employed various means to resolve these problems. Prevention must be considered before delineating the methodology of cure. To be sure, when a student enters medical school, his personality pattern is formed and this he brings with him. To return to some previous comments, should the Health Service director work closely with the Admission Committee? In some instances, he is a member of that group, and can voice his feeling regarding the applicant's potential adjustment to curricular stresses. It was believed that this is the area in greatest need of an *administrative decision*. The Health Service physician has a responsibility to the institution, to the faculty, to the administration, and to the applicant or patient. If his opinion of a prospective student is that he is a poor risk, then this should be made known. This is not an item of privilege stemming from a doctor-patient relationship, but is fully comparable to the testimony given by a psychiatrist directed by a court to examine the defendant and render an opinion.

The group believed that this activity comes within the purview of the Health Service, and that efforts to rely upon psychiatrists for this kind of judgment have not been fertile. Implied in the consensus was that the capacity of the psychiatrist to render recommendations of this sort has been overrated, and even if one were to have each applicant interviewed for an hour, no predictive values would result. The family physician, likewise, has been of little assistance in forecasting academic success. The solution seems to lie in proper motivation, and this would be the desirable entity to explore. If only those wh were well motivated toward medicine would b admitted, perhaps a number of scholastic failure could be averted.

To identify an applicant's personality structur ing, a few schools have administered psychologi test batteries. These can provide good leads, bu do we know the desirable characteristics of a physician? Has a sufficiently large sample o practitioners been studied to identify the quali ties of successful doctors? And whose criteria fo "success" will be employed? From the tests, som estimate of adjustment under stress can be fore cast, but to rely on test materials only would be foolhardy.

A counseling program for those with emotional problems is needed, but how is such an activity carried out? At an early point, the basic science faculty could identify the students in need, and refer them to the Health Service for aid, but few are identified early. In retrospect, when the histories of seniors or interns who have broken under stress are examined, clues are seen which should have been recognized as signs of impending neurotic or psychotic disaster.

Once the needs are isolated, then someone should be available to undertake the counseling or psychotherapy, or analysis, as the situation requires. Listening can be accomplished by the physician in the Health Service, but for counseling, directors have added to their staffs on a part- or full-time basis psychiatrists, psychiatric social workers, clinical psychologists, and research psychiatrists. Some have become identified immediately with the Health Service, others have remained in a consultant status, or have been available in the University Hospital.

Short term therapy can be attempted with the student's remaining in school, and on rare occasions a student can handle lengthier therapy and the curricular demands simultaneously. With others, leaving school will be necessary, as the joint stresses of therapy and study will be too strong.

Of greatest need was a psychiatrist who, on rendering counseling services, would keep the institution in mind, in addition to the patient. The feeling was expressed that in a sense "my patient can do no wrong" — the psychiatrist's "taking the side" of the patient, with no view as to the relationship of the student to the institution. Further, a psychiatrist willing to "take a stand," seemed in short supply. The Health Service directors were in need of realistic counselors with whom these problems could be reviewed. All wanted psychiatrists, but the opinions returned frequently were too ethereal for immediate application. The ideal solution seems to rest in having two persons serve in situations of counseling. The psychiatrist who sees the patient on referral will, under almost every circumstance, have to operate

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as the patient's physician and represent him whenever there is a conflict. Because of this, a second person must become involved who will make an *administrative decision,* representing the best interests of the institution, utilizing such help as he can get from the psychiatrist concerned.

Services for Employees

THE indications for a Service for employees seemed less clear cut than those justifying a preventive care program for students. The hierarchical system in Medical Centers has complicated further any smooth weaving of the fabric, for a third set of persons, the faculty, is to be considered. Although presumably simple to answer, the question "Are faculty members employees?" meets with many interpretations. A dividing of personnel is encountered in Medical Centers, and one finds the dichotomy of academic and non-academic personnel. The first group will have rights and privileges that the second is not granted.

There was some feeling that because a person is employed in a Medical Center, he is not automatically entitled to free medical attention. Comments of this type were made without awareness of the growth of industrial health practices, or that such a fringe benefit has been with us since the workmen's compensation legislative enactments of 1910. In some institutions, a separate Employee Health Service was maintained, as it was believed that this provided greater efficiency in working with two different groups.

The indications for offering services to employees are many. Primarily, it helps to keep a high absence group on the job. It renders care for their occupationally-incurred injuries, which in psychiatric hospitals can be numerous. The Service has a personnel that is aware of the occupational health hazards (solvents, heavy metals, radiant energy, etc.) present in the Center, and that can measure the hazard environmentally and the effects clinically, conduct the medical surveillance needed, and install the control measures. The provision of a preventive care program will increase morale because of the interest demonstrated in the employee, and will aid in producing more effective workers by early recognition of and counseling for impaired interpersonal relations.

Basically, the hospital industry is an underpaid one, the worker turnover is high and costly, and drifters seek employment in Medical Centers. Many of the jobs are without the usual symbols of recognition or praise, the team spirit is weak, and the cross ties among workers are loose. If this one fringe benefit can aid the situation, it is worth the investment.

Although it is agreed that a preplacement physical examination should be conducted on all new Center employees, the type of examination varies from a rather cursory review to a complete functional assessment. A baseline is needed for reference, and certain diagnostic laboratory procedures should accompany the physical appraisal, so that intelligent job placement can be accomplished.

An immunization program is in order including, usually, protection against smallpox, typhoid fever, and tetanus, and, if the employees are in the same age group as student nurses, a comparable tuberculosis control program should be effected.

Emergency care for non-occupational illnesses and injuries is given in order to keep the affected employee at work, and referral to the family physician is made for continuing care or for protracted clinical conditions. Under workmen's compensation acts, the Health Service provides medical attention for illnesses or injuries arising out of and in the course of employment. Periodic physical examinations permit knowledge of the health status as affected by physiologic or pathologic change, or by stress. The original recommendations regarding job placement can be reviewed, and this applies particularly to physically limited persons, for whom there are many possible positions in Medical Centers.

Advisory Committee

IN SEVERAL installations an advisory committee for the Health Service has been created, representing those agencies in the Medical Center whose personnel receives care through the Service. These committees may be composed of the deans of the various schools, the business administrator, certain hospital department heads, and representatives of employee and student groups.

Organizational Structure

THE organizational placement of the Health Service warranted discussion. On the single campus, the Service is most likely to be an autonomous agency with its director reporting to the vice-president in charge of medical affairs, or, in smaller institutions, to the president. Occasionally, status of the director equivalent to that of the medical school dean is seen, but in the Medical Center, the director of Health Service may be responsible to the head of the Center or to the director of the university hospital. Occasionally the Health Service operation is a function of the Department of Preventive Medicine, and tangentially is related to the hospital, or vice versa. This seems particularly important for teaching purposes.

The academic rank of the director varies. Some carry professorial titles when teaching is recognized as a primary function, and others have no immediate connection with instruction. The possession of an academic title was not believed to

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be of significance in the successful operation of the Service, as the patients see the director in his role of physician, irrespective of the cloth he wears.

Who Staffs the Health Service?

AS THESE services have grown, some change has been seen. From a desultory part-time resident or recent graduate assignment, the development has moved toward a full-time career person as director, interested in preventive medicine or student health, and more recently, on occasions, in occupational medicine.

Some Services, still, are adequately covered in smaller installations by a part-time physician, who engages in private practice or teaching during the remaining hours. A Medical Center, like most industrial plants, operates around the clock, and coverage in the Health Service is necessary after the day shift has finished. Because of the needs of this coverage or seasonal demands with new medical or nursing students entering school, part-time assistance is sought. This usually consists of residents who work on an hourly basis, or who put in time for experience only. In a few situations, fourth-year medical students will work nights and week-ends in the Service, and this is classified as an externship.

On occasions, consultant services will be required, and ordinarily members of the faculty will serve in this capacity without professional fee. Some specialists will see medical students in their private offices, and the Health Service will cover these costs. The consensus was that if the Health Service offers a good service, the students will not wish to go elsewhere for care. If outside assistance is desired by a student, it usually is asked that he "start" with the Health Service so that there can be some knowledge of his condition, and a record can be made of his problem.

The Corridor or Curbstone Practice of Medicine

DIFFERING from other situations in group life, a Medical Center is replete with physicians, nurses, and paramedical persons, all of whom will be asked to "practice" medicine at the drop of a symptom. Well known is the doctor-stoppage that goes on in hallway or hatroom, lounge or latrine, by any in the Medical Center wanting to know "what to do about this or that." In spite of used and liked Health Services, the questions are asked, and answered or parried. Physicians do not care for this off-the-blood-pressure-cuff kind of advice-giving, but numerous are the students and employees who will pursue the physician relentlessly, seeking counsel.

Faculty members can cooperate by advising the medical free-loader to consult the Health Service physician. Then, he can be referred to the same faculty person, but on a formal, convenient, and efficient basis, with full notations in the clinical record being made of the findings and follow-up. If the peripatetic practitioner cannot avoid the curbstone consultation, then the Health Service should be notified of the discussion.

Records

THE feeling about "paper work" was expressed with finiteness — there should be less of it. Although records systems are multiple in form and applicability, there seems to be an accepted standardization between the university hospitals' clinical records and those used in the various Health Services.

Many of the Health Service directors seemed to deprecate the value of their own records, claiming that "rarely is anything found in a medical chart." The illegibility of physicians' handwriting was decried — the pen scratchers had come home to roost. If the Service is viewed as an industrial installation, then accuracy and completeness in documentation are stressed because of medicolegal needs. Further, if a Service is to be "approved" by the Occupational Health Institute, the certifying body representing the Industrial Medical Association, complete records are mandatory, and brief notes will not suffice. When the Health Service is used for teaching, the staff must make meaningful entries, for they serve as examples both to the medical and the nursing students. Statistical records can be maintained by simple daily tally, or through use of peripheral or machine punch cards.

There are other reasons for a complete and usable record system. When funds are being sought at the time of budget preparation, the statistical summaries derived from the log spell out better than any narration the work load accomplished. If the figures show an increase in new patients or visits, then herein lies a justification for added facilities or personnel. Secondly, the basic records can serve as source material for research in diseases not commonly studied. Personnel in a Center will seek aid for minor conditions which, although troublesome, will not occasion their visiting a private physician. As an example, the "canker sore" was cited as a minor ailment with wide distribution, causing its share of annoyance, but about which little accurate information was at hand. With the numbers of patients presenting this at the Health Service, a definitive study could be made.

In essence, the group felt that clinical records could be made more intelligent and meaningful.

The Physical Plant

HEALTH Services are located in a variety of places, some because the area assigned was the only one available, others because this was the original site and the Center grew around it. There are Services in separate buildings, in the university hospital, in areas adjacent to lecture

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rooms, and in the outpatient department. Occasionally space is shared with a specialty clinic, and what is the Health Service in the morning becomes another clinic in the afternoon. It is difficult to have a Health Service set apart from the areas of heavy traffic, and still be accessible to its patients. Although location did play a part in usage of the Service, other less tangible factors determined its acceptance.

Positioning in the outpatient department was not thought desirable, as some who patronize the Service do not wish to have the fact known. A separate unit within the outpatient department — a wing, for example — might remedy this. If space limits one's activities, an appointment system seemed, to many, to be desirable, thus obviating long waiting periods, and loss of time from the job or class.

Teaching in the Health Service

RICH opportunities for the instruction of medical and nursing students exist in the Health Service. Medical residents would have the experience of seeing patients during the early phases of a disease, when diagnoses are difficult to make and the differential choice is broad. In what other service can one learn to treat the simpler, less bizarre, but nevertheless misery-making conditions such as the common cold, a sore throat, diarrhea, dysmenorrhea, headache, epidermophytosis, or a thrombosed external hemorrhoid? These ailments will be encountered during a preceptorship, but still many patients will not consult a doctor for these states. Some conditions have stimulated follow-up research after the residents had left the Health Service, when their curiosity had been aroused by patients not encountered elsewhere.

In one school the Health Service is the focal point for practical experience in the conducting of preplacement physical examinations on physically handicapped persons. Senior students in groups of two or three meet in an initial 45-minute orientation period, then take a complete history and do a physical examination on an employee from the Goodwill Industries, who might have cerebral palsy, a compensated amputation, a convulsive disorder, a congenital anomaly of the extremities, residual effects of poliomyelitis, a speech defect, or who might be mentally retarded. After the work-up, in a teaching conference, all three patients are presented, interviewed, and discussed. Each study has two such full mornings.

Through a student's Health Service experience he will begin to feel an awareness of his own health behavior, and of the interrelationships between stress and physical response. The physician in attendance can point up these features to the student, utilizing the latter's own experience to teach him something of symptoms, physical findings, and therapy, including drugs and the modalities of physical medicine. In the Health Service he will learn that something *can* be done for nearly every condition that is presented, and, for the everyday illnesses, therapeutic nihilism ill befits the situation.

Medical Care for Dependents

ALTHOUGH ordinarily not extended to the families of students and faculty, one Center provided coverage for dependents. In this school there were approximately 2500 employees, 300 medical students, 500 nurses, and 1000 faculty members. Of the medical students, 6% were married when they matriculated, and, in the fourth year, only half of the class was single. Of the house staff, 60% were married. The families of these students receive the same care as do the husbands, and this is extended to the faculty, provided they are on a full-time basis. House calls are made within five blocks of the hospital. The services of the well-baby clinic are offered, and discounts are given on certain items. This is provided without charge, but it is felt that, because of a certain amount of dissatisfaction, there should be some subsidization of this medical care by the student.

A prepaid insurance plan might answer this perplexing problem. The annual cost of a policy, providing both ambulatory care and hospitalization, was quoted in this area at these rates: medical student $56.60, wife $26.00, and child $24.75. Coverage, presumably for a single illness, goes to $1000.

In substance, offering care for dependents is costly, and this may not be a permanent benefit at the school under discussion, for no specific budgetary provisions have been made.

Manuals

A RATHER complete manual of policies and procedures was shown for one Health Service, but its exact value was questioned. In it are documented all procedures, and it is used to familiarize student nurses with the Service when they have their tours of two weeks' duty. Portions of the manual that relate to policies are distributed to department heads and supervisors, so that all will be operating with common understanding. As the manual contains standing orders for the industrial nurses on duty, emergency situations are covered, so that, in the absence of the physician, nursing measures may be initiated.

Other Health Services provide a student handbook or a bulletin that defines eligibility and outlines some of the procedures to be followed in seeking care. A written document is felt desirable, as it obviates operating in a vacuum. With this, all in the Medical Center can become familiar with the functions, scope of services offered, limitations, and methods of operation of the Health Service.

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Occupational Health Hazards

TOXIC materials are encountered in a medical Center, as they are in an industrial activity. Solvents, hazardous on inhalation or on repeated cleansing application to the skin, are found in laboratories and shops. Radiation exposure is experienced by x-ray department personnel, the isotope laboratory staff, and by nursing service members aiding in the positioning of infants on whom diagnostic studies are being done. Workers in laboratories and supply services are subject to dermatitis from alkaline cleansers. Custodial workers are in contact with pesticides, cleaners, and detergents.

The health hazards in a Center — in contradistinction to accident hazards — should be known to the Health Service director, and he should be familiar with their detection, environmental measurement, and clinical and engineering controls. Medical personnel have little awareness of the toxicity of many of the materials they use daily, and should be apprised of their hazards and the preventive procedures that will preclude absorption of or intoxication from them.

Plans for the Future

INTEREST in continuing this informal type of session for interchange of ideas and establishing some criteria for operation was high. The representatives believed that all of the medical schools should be brought into future deliberations, and that by solicitation of the deans, those persons actually concerned with the Health Services at the various Medical Centers would be identified. All concerned — those at this first meeting, those who manifested interest but who were unable to attend, and those from whom no reply was received — could be fused into a large working committee.

It was the consensus of the group that Dr. Dean F. Smiley, Secretary of the Association of American Medical Colleges, be apprised of forthcoming efforts that will be directed to the Medical Centers. Further, it was suggested that each of the members accept for assignment one or more topics about which to develop information by questionnaire.

It seemed desirable that a special day be devoted to the problems discussed in Oklahoma City, at the next Annual Meeting of the American College Health Association, to be held in Baltimore Maryland, April 25-27, 1957. At this session a report could be submitted reviewing the findings of the questionnaires.

Summary

REPRESENTATIVES of 15 Medical Centers met in a two-day Workshop to discuss basic factors present in the need, establishment, and programming of Health Services for students and employees. That there are many differences among various Services, and that individual tailoring is required in the structuring of these Services were recognized. There is but a small body of knowledge concerning this form of preventive medical care organization, but through a joint effort of of the Workshop members, a study will be made of the Services now operating in America's Medical Centers.

PARTICIPATING in the Workshop were:

Amidon, Dr. Richard W., University of Vermont and State Agricultural College.

Anderson, Dr. William M., Medical College of Virginia.

Baird, Dr. Glenn H., The Medical College of Alabama University of Alabama.

Chandler, Dr. Robert, University of Colorado Medical Center.

Eller, Dr. C. Howe, University of Louisville.

Felton, Dr. Jean S., University of Oklahoma School of Medicine.

Flock, Dr. Eugene R., University of Oklahoma School of Medicine.

Kay, Dr. William R., Medical College of Virginia.

Leymaster, Dr. Glen R., University of Utah College of Medicine.

McIntosh, Dr. Henry D., Duke University.

Noren, Miss Ruth A. (R.N.), University of North Dakota.

Patterson, Dr. Marcel, The University of Texas Medical Branch.

Sander, Dr. Irvin W., Wayne University.

Schrode, Dr. Paul F., University of Pennsylvania.

Stilson, Dr. Homer O., College of Medical Evangelists.

Trainer, Dr. Joseph B., University of Oregon Medical School.

Walton, Dr. H. M., College of Medical Evangelists.

Robert C. Lowe, M.D., Kirk T. Mosley, M.D., and A. N. Taylor, Ph. D., of the University of Oklahoma School of Medicine, were observers. Dr. Felton served as Discussion Leader.

The Scientific Approach

"AS SILLY as it may seem, one plant official said his company had a phrenologist who could tell by the shape of a man's head and his reactions during an interview whether or not he was disloyal, dishonest, or unfitted for his job. 'That's what the man reported,' an agent said, 'and so help me, they did employ a phrenologist.'"

—From Chapter 18, "The Enemy Within," in "The FBI Story," by DON WHITEHEAD, published by Random House, New York.

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Toxicity of Ozone

I. Effect of Oxygen and Carbon Dioxide upon Acute Toxicity

SIDNEY MITTLER, DELORES HEDRICK, and LEONARD PHILLIPS
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IN A PREVIOUS study on the acute toxicity of ozone, Mittler, Hedrick, King, and Gaynor[1] reported that the LD_{50} for a single three-hour exposure to ozone was 12.6 ppm by volume for mice, 13.1 ppm for rats, 30.1 ppm for guinea pigs, 21.6 ppm for rabbits, and 20.8 ppm for cats. Since the threshold limits for toxic gases as adopted by the American Conference of Governmental Industrial Hygienists are given in ppm by volume, and since this measurement of concentration is also used by a majority of the research workers in this field, the authors have elected to designate the concentration in ppm by volume to prevent further confusion. In the previous report[1] concentrations were given in ppm by weight. To convert concentrations in ppm by weight to ppm by volume the values given should be divided by 1.66 if the ozone is in air, and by 1.50 if it is in oxygen.

Recently, Stokinger, Wagner, and Wright[2] reported that the LD_{50} for mice exposed for four hours was 4.8 ppm. Diggle and Gage[3] estimated the LD_{50} for mice to be in the range of 10 to 12 ppm for a four-hour exposure. These differences in the LD_{50} values may be due to the various analytical methods used by these investigators. Stokinger and colleagues[2] used the method of Byers, Saltzman and Hyslop,[4] which is a modification of the Smith and Diamond[5] method, while Diggle and Gage[3] employed the iodometric method of Gluckauf, Heal, Martin, and Paneth,[6] in which the potassium iodide is buffered to pH 7. In our laboratory the modified aluminum chloride-buffered potassium iodide method was used to determine the ozone concentration. Despite the published differences in acute toxicity of ozone, this gas is indeed toxic and approaches the lethality of some of the most toxic gases.

The purpose of the experimental studies reported in this paper was to determine whether 100% oxygen or 2% carbon dioxide will influence the toxicity of ozone for various laboratory animals. The animals were exposed to ozone at a flow rate of 10 to 25 l./min. made by a water-cooled corona discharge type of ozonizer designed by Armour Research Foundation. Mice in groups of 10 and rats in groups of five were exposed for three hours in a glass chamber, while the guinea pigs received the gas by means of funnels which fitted over the heads of the animals. This is a modification of Henderson's method of exposure.[8] In earlier experiments[1] the guinea pigs, usually in groups of four, had been exposed to the gas for three hours in the glass chamber, and the inlet and outlet concentrations were averaged. The LD_{50} of 30.1 ppm was obtained from survivals and deaths of 98 guinea pigs. This LD_{50} was somewhat higher than the LD_{50} of 24.7 ppm obtained from the exposure of 102 guinea pigs by means of the funnel method. The data obtained from the guinea pigs in the glass chamber were then recalculated by using just the outlet concentrations as the concentrations, and an LD_{50} of 25.6 ppm was obtained.

Toxicity of Ozone in 100% Oxygen

TO DETERMINE whether 100% oxygen had an influence upon the toxicity of ozone, animals were exposed for three hours to ozone made from and diluted with 100% oxygen. The LD_{50} values were calculated by the Reed and Muench[9] method, for there was little difference between this method and the Probit analysis method (Table I). However, Probit analysis[10] gave 95% confidence limits which can be used for comparison of the

TABLE I.
COMPARISON OF LD_{50} VALUES FOR OZONE, CALCULATED BY REED AND MUENCH, AND BY PROBIT ANALYSIS METHODS
(Three-hour exposure)

Species	Number Animals Exposed	LD_{50}, ppm		
		Reed and Muench	Probit Analysis	
			Value	95% Confidence Limits
Mouse	100	12.6	12.0	9.8-15.0
Mouse*	96	12.6	12.5	10.7-15.1
Rat	88	13.1	13.6	11.9-15.3
Guinea pig	104	24.7	24.8	21.0-26.6

*Ozone made from oxygen.

This study was supported by funds provided under Contract AF 18(600)-944 with the USAF School of Aviation Medicine, Randolph Field, Texas.

Part I—Acute Toxicity, was published in the July, 1956, issue of *Industrial Medicine & Surgery*.

toxicity of ozone in air with the toxicity in 100% oxygen. One can assume that the concentration of ozone in air is similar to that in oxygen since the actual difference is smaller than the error in analytical techniques of ozone analysis.

A total of 123 albino Wistar strain rats, in groups of five, were exposed for three hours to ozone concentrations ranging from 5.2 to 17.7 ppm. Survivals and deaths from these experiments are presented in Table II. The LD_{50} determined by the Reed and Muench method was 12.2 ppm for ozone in oxygen as compared to LD_{50} of 13.1 ppm for ozone in air. This difference of 0.9 ppm is not significant, and it can be concluded that ozone in 100% oxygen is as toxic to rats as ozone in air.

TABLE II.
SURVIVAL OF RATS EXPOSED TO VARIOUS CONCENTRATIONS OF OZONE IN 100% OXYGEN
(Three-hour exposure)

Ozone, ppm	Deaths	Survivals	Cumulative Deaths	Cumulative Survivals	Total	Deaths, %	Survivals, %
5.2	0	5	0	79	79	0	100
5.5	0	5	0	74	74	0	100
6.3	0	5	0	69	69	0	100
7.0	0	5	0	64	64	0	100
7.7	0	5	0	59	59	0	100
7.9	0	5	0	54	54	0	100
8.8	4	1	4	49	53	7.5	92.5
9.4	0	5	4	48	52	7.7	92.3
9.8	1	4	5	43	48	10.4	89.6
10.1	3	7	8	39	47	17.0	83.0
10.7	2	3	10	32	42	23.7	76.3
10.9	0	4	10	29	39	25.6	74.4
11.6	0	5	10	25	35	28.5	71.5
11.9	7	3	17	20	37	45.9	54.1
12.3	1	4	18	17	35	51.4	48.6
12.8	3	1	21	13	34	61.7	38.3
13.0	2	3	23	12	35	65.7	34.3
13.9	4	5	27	9	36	75.0	25.0
14.3	2	3	29	4	33	87.9	12.1
14.8	4	0	33	1	34	97.1	2.9
16.0	4	0	37	1	38	97.4	2.6
16.5	5	0	42	1	43	97.7	2.3
17.7	2	1	44	1	44	97.8	2.2

LD_{50} = 12.2 ppm

TABLE III.
SURVIVAL OF MICE EXPOSED TO VARIOUS CONCENTRATIONS OF OZONE IN 100% OXYGEN
(Three-hour exposure)

Ozone, ppm	Deaths	Survivals	Cumulative Deaths	Cumulative Survivals	Total	Deaths, %	Survivals, %
9.4	1	10	1	156	157	0.6	99.4
10.2	1	9	2	146	148	1.4	98.6
10.5	0	10	2	137	139	1.4	98.6
10.6	1	9	3	127	130	2.3	97.7
10.9	1	9	4	118	122	3.3	96.7
11.5	1	9	5	109	114	4.4	95.6
18.9	4	6	9	100	109	8.3	91.7
19.1	1	9	10	94	104	9.5	90.5
19.9	2	8	12	85	97	12.4	87.6
20.0	3	7	15	77	92	16.3	83.7
22.8	7	3	22	70	92	23.9	76.1
28.0	1	9	23	67	90	25.5	74.5
30.1	5	15	28	58	86	32.6	67.4
31.4	2	9	30	43	73	41.0	59.0
33.1	4	6	34	34	68	50.0	50.0
33.8	7	3	41	28	69	59.4	40.6
35.5	3	7	44	25	69	63.7	36.3
36.5	4	6	48	18	66	72.8	27.2
40.1	12	9	60	12	72	83.4	16.6
42.0	7	3	67	3	70	95.7	4.3
44.1	10	0	77	0	77	100.0	0.0

LD_{50} = 33.1 ppm

TABLE IV.
SURVIVAL OF GUINEA PIGS EXPOSED IN FUNNELS TO VARIOUS CONCENTRATIONS OF OZONE IN 100% OXYGEN
(Three-hour exposure)

Ozone, ppm	Deaths	Survivals	Cumulative Deaths	Cumulative Survivals	Total	Deaths, %	Survivals %
14.3	1	7	1	44	45	2.2	97.8
16.1	1	3	2	37	39	5.1	94.9
16.9	0	4	2	34	36	5.5	94.5
20.5	2	6	4	30	34	11.8	88.2
20.7	2	2	6	24	30	20.0	80.0
21.9	2	2	8	22	30	26.7	73.3
23.2	4	4	12	20	32	37.4	62.6
23.9	4	0	16	16	32	50.0	50.0
24.6	3	1	19	16	35	54.2	45.8
25.3	4	0	23	15	38	60.4	39.6
26.6	5	6	28	15	43	65.0	35.0
27.2	4	0	32	9	41	78.0	22.0
30.6	1	2	33	9	42	78.5	21.5
33.7	7	1	40	7	47	85.2	14.8
37.1	2	2	42	6	48	87.5	12.5
39.0	6	2	48	4	52	92.4	7.6
40.0	3	1	51	2	53	96.3	3.7
41.3	4	0	55	1	56	98.2	1.8
43.3	4	0	59	1	60	98.3	1.7
47.3	2	1	61	1	62	98.4	1.6
51.8	4	0	65	0	65	100.0	0.0

LD_{50} = 23.9 ppm

A total of 233 mice, usually in groups of 10, were exposed to ozone in 100% oxygen in concentrations ranging from 9.4 to 44.1 ppm of ozone. The survivals and deaths from these experiments are recorded in Table III. The LD_{50} was calculated to be 33.1 ppm, which is significantly different from the LD_{50} of 12.6 ppm of ozone in air. It appears, therefore, that ozone in 100% oxygen is less toxic for mice than ozone in air.

A total of 109 guinea pigs, usually in groups of four, were exposed to 100% oxygen by means of the funnel method. The concentration ranged from 14.3 to 51.8 ppm, and the LD_{50} calculated was 23.9 ppm for a three-hour exposure (Table IV). Thus, ozone in 100% oxygen is as toxic for guinea pigs as ozone in air, for the LD_{50} of 23.9 ppm falls within the 95% confidence limit (Table I). Although the guinea pig is very sensitive to oxygen poisoning, the short exposure to pure oxygen apparently did not increase the toxicity of ozone for these animals.

Effect of 2% Carbon Dioxide on Toxicity

OZONE made from filtered, dry air was enriched with carbon dioxide to form a 2% carbon dioxide-air-ozone mixture. Rats, guinea pigs, and mice were exposed to this mixture for three hours and the LD_{50} was determined. By using the 95% confidence limit obtained from the LD_{50} of ozone in air, a comparison was made between the toxicity of ozone in air and ozone in the carbon dioxide-air mixture.

A total of 72 rats were exposed to ozone concentrations ranging from 5.7 to 16.9 ppm. The LD_{50} for ozone in the air-2% carbon dioxide mix-

ure was found to be 10.2 ppm, which is not significantly different from that of ozone in air. The data from which the LD_{50} was calculated are presented in Table V.

A total of 151 mice, usually in groups of 10, were exposed for three hours to ozone in air containing 2% carbon dioxide, in concentrations ranging from 6.7 to 20.4 ppm of ozone. The LD_{50} was found to be 12.7 ppm, and the data from which this was calculated are presented in Table VI. For mice, the LD_{50} of ozone in air was found to be 12.7. Accordingly, it can be concluded that 2% carbon dioxide does not influence the toxicity of ozone for mice.

A total of 200 guinea pigs, usually in groups of four, were exposed for three hours to ozone containing 2% carbon dioxide, in concentrations ranging from 8.7 to 43.7 ppm of ozone. The data obtained are presented in Table VII, and the LD_{50} was calculated to be 19.2 ppm. This value is just beyond the lower limit of 95% confidence limits of the LD_{50} of ozone in air, and it can be concluded that carbon dioxide increases the toxicity of ozone for guinea pigs.

TABLE V.
SURVIVAL OF RATS EXPOSED TO OZONE IN AIR ENRICHED TO 2% CARBON DIOXIDE
(Three-hour exposure)

Ozone, ppm	Deaths	Survivals	Cumulative Deaths	Cumulative Survivals	Total	Deaths, %	Survivals, %
5.7	0	5	0	28	28	0.0	100.0
6.5	4	0	4	23	27	14.8	85.2
7.6	0	5	4	23	27	14.8	85.2
8.5	0	3	4	18	22	18.3	81.7
9.2	2	3	6	15	21	28.2	71.8
9.9	5	4	11	12	23	47.7	52.3
10.9	8	2	13	8	21	62.0	38.0
11.6	8	1	21	6	27	77.8	22.2
12.3	3	2	24	5	29	82.8	17.2
13.2	6	3	30	3	33	90.4	9.6
14.1	4	0	34	0	34	100.0	0.0
15.5	3	0	37	0	37	100.0	0.0
16.9	5	0	42	0	42	100.0	0.0

LD_{50} = 10.2 ppm

TABLE VI.
SURVIVAL OF MICE EXPOSED TO VARIOUS CONCENTRATIONS OF OZONE IN AIR ENRICHED TO 2% CARBON DIOXIDE
(Three-hour exposure)

Ozone, ppm	Deaths	Survivals	Cumulative Deaths	Cumulative Survivals	Total	Deaths, %	Survivals, %
6.3	0	10	0	84	84	0.0	100.0
7.8	5	5	5	74	79	6.3	93.7
9.2	2	7	7	69	76	9.2	90.8
9.4	1	10	8	62	70	11.4	88.6
10.1	4	6	12	52	64	18.8	81.2
10.2	3	7	15	46	59	25.4	74.6
10.5	5	5	20	39	59	33.9	66.1
12.1	4	6	24	34	58	41.4	58.6
12.7	6	13	30	28	58	51.7	48.3
15.4	2	8	32	15	47	68.2	31.8
17.1	9	2	41	7	48	85.4	14.6
18.0	8	2	49	5	54	90.7	9.3
18.2	8	2	57	3	60	95.0	5.0
20.4	10	1	67	1	68	98.5	1.5

LD_{50} = 12.7 ppm

TABLE VII.
SURVIVAL OF GUINEA PIGS EXPOSED IN FUNNELS TO VARIOUS CONCENTRATIONS OF OZONE IN 2% CARBON DIOXIDE
(Three-hour exposure)

Ozone, ppm	Deaths	Survivals	Cumulative Deaths	Cumulative Survivals	Total	Deaths, %	Survivals, %
8.6	1	3	1	85	86	1.2	98.8
9.1	0	4	1	82	83	1.2	98.8
10.6	0	4	1	78	79	1.3	98.7
11.4	3	5	4	74	78	5.1	94.9
11.8	1	7	5	69	74	6.8	93.2
12.3	1	3	6	62	68	8.8	91.2
12.7	0	4	6	59	65	9.2	90.8
13.4	2	6	8	55	63	12.7	87.3
14.8	5	3	13	49	62	20.9	79.1
16.5	3	13	16	46	62	25.8	74.2
18.5	1	3	17	33	50	33.9	66.1
19.4	14	6	31	30	61	50.7	49.3
19.9	3	1	34	24	58	58.6	41.4
21.5	3	1	37	23	60	61.7	38.3
21.9	3	5	40	22	62	64.6	35.4
22.6	5	3	45	17	62	72.6	27.4
23.6	5	7	50	14	64	78.1	21.9
24.5	4	0	54	7	61	88.5	11.5
25.5	3	1	57	7	64	89.1	10.9
26.1	6	2	63	6	69	91.3	8.7
26.8	4	0	67	4	71	94.4	5.6
29.1	3	1	70	4	74	94.6	5.4
29.6	4	0	74	3	77	96.1	3.9
30.3	4	0	78	3	81	96.3	3.7
30.8	4	0	82	3	85	96.5	3.5
31.5	2	2	84	3	87	96.6	3.4
34.1	4	0	88	1	89	98.9	1.1
35.7	4	0	92	1	93	98.9	1.1
37.2	4	0	96	1	97	99.0	1.0
38.0	3	1	99	1	100	99.0	1.0
40.0	8	0	107	0	107	100.0	0.0
43.9	8	0	115	0	115	100.0	0.0

LD_{50} = 19.2 ppm

TABLE VIII.
COMPARISON OF LD_{50} FOR SEVERAL LABORATORY SPECIES OF OZONE IN AIR, OZONE IN 100% OXYGEN, AND OZONE IN 2% CARBON DIOXIDE
(Three-hour exposure)

Species	Ozone In Air	Ozone in 100% Oxygen	Ozone in Air and 2% Carbon Dioxide
Mouse	12.6	33.1	**12.7**
Rat	13.1	12.2	10.2
Guinea pig	24.7	23.9	19.2

Comment

THE TOXICITY of ozone is markedly decreased for mice if the ozone is administered in 100% oxygen. However, 100% oxygen does not affect ozone toxicity for rats and guinea pigs (Table VIII). This decrease in toxicity for ozone in 100% oxygen for mice is indeed puzzling, since recent work indicates that 100% oxygen administered after exposure to ozone in air does not protect mice from death by ozone poisoning. Ozone poisoning is similar in some respects to oxygen poisoning in that both are pulmonary irritants. However, exposure to only 0.001% of ozone for several hours can be fatal, while 100% oxygen can be tolerated for as long as 24 hours before any effects are noted. Derangement of central nervous functions occurs when the oxygen is administered under pressure.[11] There is no information available on the effects of ozone administered under pressure. However,

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data obtained in our laboratory have shown that ozone does not reach the blood at 1 atm. pressure. Since ozone reacts rapidly with organic substances, the chances that other systems may become involved appears to be remote. There is also a species variation with respect to toxicity of these gases. Rats are resistant to oxygen poisoning but are comparatively sensitive to ozone poisoning, while guinea pigs, which are the most resistant laboratory animals with respect to ozone poisoning, are comparatively sensitive to oxygen poisoning.

The decreased toxicity of ozone in 100% oxygen for mice is difficult to explain. Rats exposed to ozone in oxygen were apparently protected from death by the 100% oxygen present in the chamber, because they survived high concentrations during the exposure but died within a matter of minutes when brought into room air. However, the protective action of oxygen in the case of the mice persisted even after the animals were brought into room air. It is not unusual to expect oxygen to prevent death from ozone poisoning because death from ozone is usually the result of asphyxiation induced by the irritation of the respiratory tract.

Carbon dioxide at a concentration of 2% exerts some influence upon the toxicity of ozone in that the toxicity is increased slightly for rats and guinea pigs. This is not unexpected, for carbon dioxide increases the respiratory rate, and hence more ozone per unit of time is inhaled and thus able to react in the respiratory tract. An animal dying because of a lack of oxygen would certainly not be aided by the inhalation of an atmosphere enriched with carbon dioxide because the amount of oxygen available to the animal would be correspondingly decreased.

Summary

OZONE in 100% oxygen was less toxic for mice than ozone in air. The 100% oxygen had no influence on the toxicity of ozone for rats and guinea pigs. Ozone in a 2% carbon dioxide-air mixture was more toxic for guinea pigs than ozone in air. The 2% carbon dioxide had no significant effect on the toxicity of ozone for mice and rats.

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"Publicity Is Needed"

ONE DOES NOT appreciate the tremendous advances that have been made by the industrial physicians in preventive medicine until he talks with some of them about their work. The physician is constantly working with technical groups to devise ways and means of preventing accidents. He is working with specialists in their fields to prevent the toxic effects on the body of the various poisonous substances used in industry. He works with the various supervisors to improve job placement so that those men with eye, ear and bronchial difficulties will not be subjected to undue strain. At regular intervals, those persons with known physical defects and those working in hazardous jobs are given appropriate examinations to determine how safe it will be for them to continue at their present work from their own standpoint, as well as from that of their fellow workmen. In many places all those past 50 years of age are given regular appraisal. I mention these things only because I am sure that most of the medical profession are not fully aware of what is being done for the older worker. For this reason, I feel that much more publicity is needed in the communities where industry is located so that the physician caring for the sick worker in his home will have a much better understanding of the over-all problem. He will make a greater effort to plan a rehabilitative program to get the worker back to work as soon as possible. The longer he stays away from work the more likely he is to develop a chronic disabling illness.

—From the Remarks of A. HAZEN PRICE, M.D., at the Symposium on "Absence from Work Due to Non-Occupational Illness and Injury," Sixteenth Annual Congress on Industrial Health, January 24, 1955, Detroit.

Evaluation and Management of the Alcoholic Employee

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PSYCHIATRICALLY, it is possible to find just about whatever you're looking for in a group of alcoholics. Various attempts have been made to explain the alcoholics' difficulties on the basis of personality. They have been called "oral characters," deprived as infants of their necessary satisfactions, who later attempt repetitiously to overcome this deprivation. Presently, the alcoholic is described as being emotionally immature, or behaving in a manner that doesn't befit his age—this label and this behavior are not exclusively peculiar to the alcoholic.

A recent article described a treatment program for the alcoholic in industry and presented some rather stringent generalizations about this group. For instance, they were found to be "immature people who cannot withstand the frustration of instinctual impulses." Yet, on the other hand, the average time of employment at the same company of the group was 22 years, which would seem to indicate that in spite of their impulsiveness and immaturity, they were, as a group, rather persistent.

Alcoholics have also been considered degenerates lacking in concern for self, for family, and for society. Consequently, society has risen to the occasion and incarcerated them repeatedly for varying periods at considerable expense and effort. This has been successful only for the time the individual was kept out of sight; however, before the community is condemned for its punitive efforts it should be added that these attempts have been made for lack of a better solution. It is worth recalling that the day when the mentally ill were similarly managed has only recently passed, and this passing is not yet complete in areas lacking facilities to care for the very disturbed. The answer to the problem can hardly be expected to arise spontaneously from the community itself.

The most workable solution to the problem of the alcoholic so far has come from the alcoholics themselves — in the form of Alcoholics Anonymous. There are few instances in which those afflicted actively sought to find their own solution to their sickness, literally the blind not leading, but restoring, the blind. Incidentally, their approach to group psychotherapy was somewhat previous to its general use in psychiatry. Medicine, in recent years, has accepted an increasing responsibility for the care of both the alcoholic, as such, and the physical and mental complications resulting from prolonged excessive use.

With the alcoholic as with the mentally ill there is an overlap in medical and legal responsibility which cannot be too consistently defined. Until a patient's incompetence is at least temporarily legally established, it is, as one alcoholic put it, his inalienable right to drink if he so desires; and he cannot be arbitrarily treated medically without his consent. This not too subtle fact is seldom appreciated by the patient's family or his employer, who are understandably anxious to have "something done" to prevent the patient's continuing his rapid decline, which places the family as well as the patient in further jeopardy. It must be appreciated that if the patient is to remain outside an institution his cooperation and desire are essential to a change in his drinking pattern. Without it the employer's concern and the family's fear are of little help.

On the basis of their behavior while not drinking, alcoholics may be described as passive or aggressive in their relationship with other people. The passive group is characterized by an inability to express hostility or anger; they are too considerate of other people and thereby vulnerable to imposition. They dislike disharmony and argument, and conceal the anger and resentment they feel over small slights. They are well liked, and their family, friends, and not infrequently their employers, are protective of them. This attitude in turn fosters dependence in the patients. Their lack of self-confidence demands alcohol to overcome a fear of failure when any new task is attempted, but the drink they take to overcome their fear repeatedly assures their failure. They are continuously dissatisfied with themselves when sober over what they have failed to accomplish; their goal for themselves may be grandiose

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as compared to their abilities — or too near perfection to allow of accomplishment. As a result they are regularly unhappy.

In some instances such patients are almost infantile in their lack of self reliance. The wife or family, who, after years of hope and disappointment, attempt to keep them under constant surveillance, allow them only enough money for carfare or lunch, and in essence, deprive them of all responsibility. In an extreme situation the only satisfaction such a patient experiences, arises from the alcohol he drinks and his efforts at overcoming the obstacles that prevent his obtaining it.

The aggressive group have an unusual amount of energy, drive, and physical stamina. They are inclined to continue and "overdo" any activity, including drinking until they are exhausted or comatose. Until the fourth or fifth decade of life they show unusual recuperative powers and are able to recover rapidly following a bout. As they grow older the intervals between the drinking episodes shorten as they gradually lose their tolerance to alcohol. On routine physical examination they may show an unexplained enlargement of the liver, and will pass their drinking off by saying they have "a couple before dinner" — they fail to mention they may have a fifth after dinner.

The ability and drive these men possess frequently result in their being quite valuable to their organization and attaining positions of great responsibility.

Usually when an unselected group such as alcoholics are examined psychiatrically, most will fit into some psychiatric group, but there will also be a disturbing high percentage who come close to the mythical normal. This problem of finding "normals" to use for standards of comparison is not easily solved; of course, the psychiatrist can always take himself for the normal, but the public may view this standard with considerable skepticism. Consequently, it is not unusual to find several who on the basis of their psychological responses would be classed as "normal alcoholics." This paradox is not exclusive to psychiatry; it is not too rare for a patient to come to autopsy with the conclusion he shouldn't be dead, which doesn't change his status materially.

Explanation of Cause

PHYSICALLY, alcoholics have been thought by Dr. Roger Williams, at the University of Texas, to have an inborn need for an excessive amount of vitamins or an inability to utilize what they consume. This conclusion, like most pertaining to alcoholics, has its proponents and its skeptics. There is one certainty, that until he starts adding vitamins to alcohol, any individual who drinks in preference to eating, or only has a couple of bites before his evening bottle, is going to have a vitamin deficiency following a bout.

Alcoholics are also said to have a glandular deficiency primarily involving the adrenals, and therefore it has been recommended that an extract of these glands be administered. However, several reports have failed to reveal a regularly decreased function of these particular glands even in those with delirium tremens, and have failed to substantiate the hypothesis. It has also been equally strongly recommended that alcoholics receive a preparation to stimulate these same glands.

Back in 1916 the explanation of delirium tremens or the "horrors" was that the alcoholic had a "wet brain" and therefore he should be dehydrated, or "dried out." Until 1937 alcoholics were dehydrated with purges and restriction of fluid. Since that time they have been hydrated, that is, given fluids. The alcoholic, unmindful of the controversy, cooperated by responding to both methods of treatment.

Too, alcohol has in the past been credited with causing various physical ills including everything from a red nose to mental retardation in the patient's offspring. Unquestionably, a high percentage of those who develop cirrhosis of the liver are alcoholic, which is a more easily substantiated statement than the converse that most alcoholics have cirrhosis. They do suffer damage to their liver during a bout, with a partial recovery during abstinence, but oddly enough few people worry about their liver since it's no longer fashionable to be "bilious."

There are a few consistent findings in alcoholics: first, they've got to drink alcohol in some form in excess to qualify; second, regardless of how they were before, if they drink long enough, they will begin to show similar characteristics (namely a denial of the severity of their problem, an increasing dependence on alcohol, etc.); third, this is apparently an incurable illness which can be halted at any point in its development, but once established is irreversible — i.e., once an alcoholic, always an alcoholic. Is the drinking the sole cause of the alcoholism, and if so, where is the line to be drawn between social drinking and alcoholism — or does the alcoholic drink for reasons which existed before he took the first drink? For instance, does one inherit the tendency to become an alcoholic?

Several studies have shown a higher incidence of this illness in the alcoholic's family than in the general population; too, it is not at all rare to find the illness in one or more of the children of an alcoholic parent. In any event, it appears that those with a history of alcoholism in their immediate family would have a greater cause for concern about their drinking than those without this background. Alcoholics frequently drink differently from the start and for different reasons than non-alcoholics.

The social drinker knows his capacity, and even though he enjoys drinking, he is restrained by the

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consequences of his behavior and the opinions of others. He seldom has a need for more than two or three drinks prior to a meal (granted there are exceptions such as wakes, weddings, conventions, and what not), but these are occasions in which his behavior may again fit the pattern of his particular group. By contrast, the alcoholic either lacks these restraints, or, when drinking, loses concern over the consequence of an excessive intake. Actually, abstinent alcoholics are seldom bothered by other people's social drinking, provided the other people have sense enough not to embarrass them by insisting they partake.

It is questionable whether the alcoholic ever drinks in the social sense of the word — i.e., he has a different motivation, responds differently, and derives a different type of pleasure from the alcohol than does the non-alcoholic drinker. The loss of the control over the drinking may require a long period to develop, and the patient considering his drinking history in retrospect may insist he had no "real" problem until he lost a job, had a car wreck, or was no longer able to conceal the extent of his drinking, when actually he had abnormally depended on alcohol for years before it became obvious. A fair beginning point of the length of time a chronic alcoholics' drinking has been beyond his control is the date when he began to lose jobs because of it. In ordinary social drinking the alcohol is secondary to the socializing. With the alcoholic, it is primary and replaces the social function entirely, and becomes an end unto itself.

In other areas alcoholics are less consistent, but show some recurring patterns. Most drink excessively from the start; they are inclined to drink to the point of becoming stuporous or comatose, or at least to an unresponsive state which could hardly be called pleasant. For example, an individual who drinks to the point that he blisters or burns the tissue from his fingers with a cigaret he has forgotten, and does not respond to the pain is drinking like an alcoholic. Similarly, the patient who starts drinking in the afternoon and the following day has no memory of his activities for several hours has a fair warning of his problem. This tendency to lack control of their intake or to take a greater amount than others may be basic to the cause of their becoming alcoholic.

There is no particular relationship between alcoholism and intelligence. The gifted and the feeble-minded may have equally severe problems except the more endowed may have greater concern over the results of their behavior while drinking. Unfortunately, this added concern is more likely to promote more drinking than to encourage sobriety.

To label an individual an alcoholic carries some undesirable characterizations in the minds of most employers; he may then be considered unpredictable, irresponsible and unreliable, and consequently absenteeism, an accident, or an illness for any reason is likely to be presumed to result from his alcoholism.

Unfortunately, the employer is seldom aware of an individual's being an alcoholic until the problem is long-standing, since the alcoholic must either present himself for work while intoxicated, drink on the job, or have an excessive or peculiar type of absenteeism to clarify the diagnosis. As Dr. Gehrmann has previously pointed out, alcoholism is the only illness that is likely to occur most frequently on Monday morning.

There are many popular theories on how and what an individual must drink to qualify as an alcoholic. For instance, some think that a man may drink a fifth of whiskey a day provided he makes certain he doesn't drink alone, and still not be an alcoholic. The only thing not drinking alone guarantees is that the available alcohol will have to be shared with someone else. Others hold the opinion that a routine of 12 or more bottles of beer an evening does not constitute a problem provided the drinker is careful not to touch any whiskey. Some feel a patient isn't really alcoholic unless he's had delirium tremens or seen a few "pink elephants." This idea is reinforced by the fact no one has ever seen him obviously drunk, or for that matter totally sober. Neither can alcoholism be diagnosed by the clock, it isn't necessary for an individual to start drinking in the morning, before lunch or before 5:00 P.M. to qualify, although as the illness progresses, the hour at which the first drink is taken may be earlier in the day. For instance, the patient, who after several years of excessive drinking begins to conceal a bottle in his desk, did not become an alcoholic the day he hid the bottle in his lower right-hand drawer. A distinction is to be made between whiskey on the premises and concealing a bottle for regular consumption. He may only have a couple before dinner, but if he has a fifth after dinner — he's still an alcoholic. Many of these misconceptions are used by the alcoholic to disprove his diagnosis to himself. He may point out that he can "take it or leave it alone," "knows plenty of people who drink more than he does," "has been to many a party and never touched a drop," etc. In essence, any individual who relies on alcohol to meet the ordinary demands of living and continues to drink excessively after alcohol has caused him occupational or marital difficulty, is an alcoholic whether he drinks only in the evening, has never taken a drink when alone, or hasn't touched anything but beer for five years.

The most destructive effect of alcohol is not physical but social and psychological. As the patient continues to drink, his behavior becomes less tolerable socially, and he is gradually ostracized from groups in which he was previously accepted. Whether he wanted to be with these social groups

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in the first place and drank to avoid them is still moot. It is unfortunately far from rare for a successful man to have a less competent son whom he expects to duplicate his own success; whether the boy is interested or able may not be too often considered, and consequently he may excel only in his alcoholic intake. In fact, it sometimes seems that if a father works hard and provides for all his children's physical needs and deprives them of all responsibility, at least one may attempt to find his satisfaction in alcohol.

A passive alcoholic, rather than risk an argument while sober by refusing to enter an uncomfortable social situation, would be more apt to go and then justify drinking himself into a stupor by the fact that he didn't want to be there in the first place. Likewise it is not particularly rare for an alcoholic to greet an increase in responsibility or a promotion with a bout — not because he wants to celebrate, but because he becomes fearful and anxious that he may fail or be inadequate. Psychologically, the effects of repeated failures, whether from drinking or any other cause are devastating, and eventually the individual either accepts a less competitive and materially less rewarding existence or evolves his own explanation for his troubles which satisfies him, although it may have little evident relationship to reality.

Management's Approach

FROM THE preceding it is obvious that alcoholism is not a problem which may be solved by a single directive. The employer's approach to the alcoholic should be as practical and free of bias as circumstances allow. The management and decision regarding the alcoholic employee should be based on his particular problem, and not on the personal feeling of the one charged with helping him.

It is wrong to conclude that because an employee has a problem with alcohol, he is the same as all other similarly ill people, or that his diagnosis makes him untreatable. Alcoholism, as any other illness, must be evaluated individually as to its severity; however, like an infectious illness, the alcoholic's condition may jeopardize others who work with him, which requires restrictions and limitations other disabilities do not impose.

To generalize about any problem is normal and time-saving, but not always accurate. Nevertheless, we usually place like things in categories for convenience, which saves the effort of examining them individually. For example, all sin is bad (particularly in others), all psychiatrists are peculiar, etc. Also, all alcoholics are hopeless because even though they stay sober for a week, a month, or a year, sooner or later they'll drink and sooner or later they'll die, but they can't be legally buried until they're dead, nor considered hopeless without the opportunity to fail.

In no other illness is an evaluation of the patient so necessary as in alcoholism, because, regardless of the duration of the drinking, the previous attitude of the patient, and the frequency with which he has failed in the past, the possibility remains that he may successfully abstain. He should have the choice of seeking treatment from his own physician, or, if he desires, the company should furnish him with information as to where help may be obtained. This information should include both medical and non-medical assistance. The employer can only make treatment available to the alcoholic who desires and will accept it. He can increase the motivation for sobriety by requiring the alcoholic's successful cooperation if he is to continue in his job. Unless the patient is convinced of the need to abstain and of his inability to take a single drink, then the best that can be hoped for is a little more prolonged interval between bouts.

What motivates an alcoholic to seek and accept treatment? It is unusual for a patient who has been drinking for years suddenly to pause in the midst of a bout and say to himself, "I believe I have a problem." More than likely he has gone through a prolonged process of rationalization to deny the existence of the problem or to minimize it. Consequently, it is not feasible to expect a sudden reversal of his thinking without some outside motivation. The alcoholic most frequently seeks treatment following a bout, when he is physically ill from drinking; at this point his resolve to abstain is at a peak. He may literally become sufficiently weary of the cycle of temporary abstinence, improvement in his physical status, with renewed self-confidence and a resumption of his drinking followed by another illness, to conclude the temporary relief the first drink gives is not worth the inevitable consequences, and accept help from an outside agency.

It must be stated that an alcoholic does not take one or two drinks and immediately become obviously drunk or behave in a manner that would suggest his total lack of control of his drinking; in fact, it may require a month fully to establish his usual intake after he starts. He may take only one drink today and use this momentary control to justify taking two tomorrow and three the next day, until he again resumes his previous excessive intake of alcohol.

An organization should have a clearly stated and fixed employment policy regarding the management of the problem drinker. This policy has to consider both the employee and the employer, since an unending tolerance of intoxication in an individual is harmful to the alcoholic, and to the morale of other employees, and is incompatible with the efficient working of any organization. At the same time, it must be appreciated that the step from drunkenness to total sobriety is not an easy one, and that one or two slips are to be

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expected, but that two or three is the maximum that practicality allows. Too, if the alcoholic employee is aware that this is the policy of the organization and not merely a personalized threat stated for his benefit, he will be more apt to accept the necessity for sobriety. The greater the responsibility of the job the alcoholic employee holds, the greater the need for impartial enforcement of the policy, since to be tolerant of intoxication at one level and intolerant at another cannot but create justified resentment.

A tendency is seen occasionally in those managing alcoholics to ignore the individual and give instead a discourse on their personal theories and opinions about those who drink. At the other end of the scale is the too-concerned individual who is going to "save everybody"—whether they are interested in being saved or not. This may include attempts to "cover up" for the alcoholic, which only delays and encourages the inevitable and defeats the purpose of treatment, namely, to re-educate the individual permanently to accept an alcohol-free existence.

It is wise to have those responsible for the alcoholic acquaint themselves with the problem by reading adequately of the available literature, and if possible to have them attend a clinic where such patients are treated so that they may have an opportunity to learn firsthand a practical approach to the problem. This method of qualification is far more desirable than giving this responsibility to an individual who already has fixed, positive and unchangeable opinions about "all" alcoholics, based on his own previous personal experience. This individual may have had an alcoholic, improvident father at whom he is still angry, which is not the most desirable qualification for helping an employee with uncontrolled drinking.

Above all else the one responsible for the alcoholic must have common sense and controlled enthusiasm. He must not show too much elation over the patient's sobriety, nor become depressed if he "slips." It must be appreciated that although the alcoholic can certainly be treated, the motivation and desire for help must exist within the patient and his behavior must remain his own responsibility.

Alcoholics are unusual people. They do not show any great affinity for psychiatrists. This is a uniqueness which they unfortunately share with most non-alcoholics — therefore some tact is required in referring them for treatment. Depending on the size of the organization, there may be a question as to whom the problem should be referred. If the alcoholic demonstrates abnormal behavior, appears depressed, or evidences a disturbance in his thinking (most frequently ill-founded or illogical suspicions or grandiose opinions such as wanting his picture placed in all the bars in town so the bartenders won't sell him whiskey), he should certainly be examined psychiatrically, since in such cases the drinking may only be evidence of a severe underlying mental disturbance. On the other hand, if his non-drinking behavior is relatively stable and thinking appropriate, then a psychiatrist appraisal is not mandatory.

Who is best qualified to treat the alcoholic? Essentially the individual who is most able to decrease the patient's need to drink and thereby offer him the most help in abstaining. This may be his personal or industrial physician, or, if the trend toward specialization continues — the old family psychiatrist. He should be put in contact with Alcoholics Anonymous; the first group the patient attends may not be the one most desirable for him to join, and he may need to "sit in" on the meetings held by several groups before he finds the "right" one.

There can be no compromise with the need for total abstinence. There can be no "cutting down," or "social drinking"; the alcoholic must be continuously sober or in the process of getting drunk. Therefore, administratively, the fact must be stressed that sobriety must become a permanent and not a temporary state for the employee.

Summary

DEPENDING on the size of the organization, the following suggestions are made:

1. Factual and readable information on alcoholism prepared for the laity is obtainable and should be made available to all employees; any inquiries should be held in confidence.

2. If a nurse or physician is not employed, an interested individual in the personnel department should be acquainted with the secretary of the local Committee on Alcoholism, if one exists, and with one or more members of Alcoholics Anonymous, and should frankly discuss his situation with the employee, advise him (or her) of the company's policy, and put the alcoholic in contact with a member of one of the above-named organizations. The person charged with the responsibility of the alcoholic should also have a list of physicians who are interested in the problem and want to work with these patients.

3. If medical personnel are available, some one individual (physician or nurse) should be assigned the responsibility and should make an effort not only to familiarize himself with the medical aspects of alcoholism, but also should be encouraged personally to investigate the available treatment facilities and become acquainted with members of Alcoholics Anonymous to be certain where and to whom the employee is referred.

4. If the company employs a physician, he may treat the alcoholic after a physical examination by giving him antabuse or a similar new drug presently being investigated. Either of these preparations taken regularly will immediately make the

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alcoholic ill if he drinks. Granted the reaction may be severe, but the only difference between being sick with an alcohol-antabuse reaction and being sick from an alcoholic bout is that with the antabuse it's quicker.

Finally, it must be realized that alcoholics drink for relief rather than for pleasure, and that by virtue of their intolerance they are permanently and totally barred from an immediate and constantly available source of relief from their tension. Also it must be appreciated that they come in all shapes and sizes, and the contents may belie the container, so they must be individually evaluated before passing judgment.

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Woman of the Year

—ALICE HAMILTON—

When Upton Sinclair was living in Mary McDowell's stockyards settlement house in Chicago and raking up the muck for his novel, *The Jungle*, a trim little (5 ft. 4 in.) woman doctor named Alice Hamilton was living only five miles away in Hull House. Indiana-bred, raised in ease, and educated at Miss Porter's famed school at Farmington, Connecticut, Alice Hamilton was working at the turn of the century as a bacteriologist by day but did settlement work by night and on week ends. Thus she met countless victims of industrial hazards and eventually became the founder of industrial medicine in the United States.

When Dr. Hamilton started out, the A.M.A. had never held a meeting on industrial medicine, and technical papers on it by U. S. doctors were rare (though European work on it filled volumes). There were safeguards of sorts against physical accidents, but for a workman who spent years absorbing a slow but deadly poison, there was little thought. Dr. Hamilton had heard of men choked by carbon monoxide in the steel mills, of men palsied by white lead poisoning, of others disabled by arsenic and cyanides, of men with the "bends." To Alice Hamilton's socialist conscience, all this was outrageous.

In 1910 she got her chance to do something about it: Illinois' Governor Charles Deneen appointed her to a state commission to investigate "occupational diseases." Her commission did not know where to begin because there was not even an official list of dangerous occupations, so Dr. Hamilton compiled it as she went from factory to factory. She could not demand admittance, but most managers let her in. The woman doctor brashly invaded the man's world, plowed through unventilated, fume-filled plant after plant. She took air samples, studied the ubiquitous dusts, noted how men did their jobs.

Before the Illinois work was finished, the Federal government asked Dr. Hamilton to do a similar job. This kept her roving through mine, mill and smelter for a dozen years. She combated the effects of such anciently known poisons as mercury, used by hatters in matting felt and a frequent cause of brain damage (hence, some say, the expression "mad as a hatter"). And she fought ultramodern lethal concoctions—TNT, aniline dyes, picric acid, which stained its workers so yellow that they were dubbed "canaries." She campaigned for ventilation, antitoxic rinses, safeguards of all kinds.

Spinster Hamilton, long devoted to the causes of woman suffrage and of birth control for the masses, once bitterly chided Boston for opposing woman suffrage longer than Chicago, women doctors longer than New Orleans. But it was from Harvard's medical faculty that she got her greatest honor: as early as 1919 Harvard named her Assistant Professor in Industrial Medicine.

Crusader Hamilton saw U.S. industry increasingly accept the fact that its workers' health was inseparable from an evergrowing productivity, saw her field broadened beyond the now obvious hazards of poison to include psychological hazards as well.

Now a spry 87 and long retired, Dr. Hamilton is remembered by U.S. medicine. Last week she made a return trip to antifeminist Boston to gather a little more belated recognition of work that has saved the health and lives of thousands. Her colleagues in the American Medical Women's Association voted her New England's "woman of the year" in medicine.

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Second Symposium on Industrial Medicine and Toxicology

University of Miami, Coral Gables, Florida
December 14-15, 1956

Reported by RAFAEL PENALVER, Havana

THE SECOND SYMPOSIUM on Industrial Medicine and Toxicology, sponsored by the University of Miami School of Medicine, was held December 14-15, 1956, at the University of Miami, Coral Gables, Florida.

Homer F. Marsh, Ph.D., Dean of the School of Medicine, welcomed the participants. William B. Deichmann, Ph.D., Professor of Pharmacology, was Chairman of the Symposium, and Ralph Jones, Jr., M.D., Professor of Medicine, was Co-Chairman.

Following are summaries of the Conference presentations:

EDWARD C. HOLMBLAD, M.D., Managing Director, Industrial Medical Association: "What Industrial Medicine Has Contributed to Industry"—

"Industrial medicine has developed during the past half century from the care of injured workers to complete comprehensive industrial Medical Department programs. The objective is the maintenance of the optimal health and efficiency of the worker. These programs include such procedures as preplacement medical examinations designed to place the employee in the proper work for his capacities, both physical and mental; the care of the injured, and the preliminary treatment of non-occupational conditions that come on during working hours; rehabilitation of the sick and injured, and the providing of healthy and safe places in which to work. Their studies of absenteeism, accompanied by periodic health examinations, improve work attendance and productivity. The problems of women workers and those of the older workers, together with the development of executive health programs, are subjects of their constant and progressive study. Through their health counseling and their understanding of practical mental health programs, much has been accomplished in keeping the workers healthy. These activities of the Medical Departments in industry have produced so many tangible benefits that industrial medicine is now considered an essential function in good management. Among these benefits are reduced workmen's compensation costs, reduced absenteeism, greater productivity, improvement in the quality of the product or service, better employee attitudes, greater job satisfaction, and improved industrial relations."

ROBERT E. ECKARDT, M.D., Ph.D., Director of Medical Research Division, Esso Research and Engineering Company: "What the Practicing Physician Needs to Know about Clinical Toxicology"—

"Man is capable of responding to toxic agents in a limited number of ways. His response to any particular agent will be dependent upon the degree and duration of his exposure, and may be influenced by a variety of pre-existing conditions. There are few specific clinical tests available for the determination of toxic reactions in man. As research in toxicology is expanded, the number and variety of these will increase. At the present time, however, diagnosis is dependent upon careful clinical observations supplemented with equally careful appraisals of the exposure patterns."

(The available clinical toxicological tests were outlined.)

P. W. LOGAN, Division Manager, Southern Insurance, Loss Prevention Department, Liberty Mutual Insurance Company: "Why Safety and Medical Departments Work Together"—

This presentation illustrated a business organization, showing how safe methods arrive at high quality, ample quantity, and low cost. This included what management and supervision have to control, and illustrated how the work of the safety engineer, the industrial hygienist, and in-plant medical skills are blended for the desired result. Specific guides for effective control of accidents and good health for any establishment involve the basic factors: (1) Sustained management support and direction. (2) Adequate safety organization—who will do what? (3) Active participation by supervisors—"plus" participation. (4) Employee education—putting "plus" in education and training. (5) Control of occupational hazards (with illustrations of the three approaches to control). (6) Adequate in-plant medical and first aid programs. (7) Regular inspections to detect unsatisfactory working conditions—use of imagination. (8) Investigation of accidents—with necessary corrective measures.

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RODNEY DURRANCE, Director, Workmen's Compensation Insurance, Florida Industrial Commission: "Fundamentals of Workmen's Compensation Laws"—

"A workmen's compensation program is a part of an over-all pattern of income insurance whereby cash wage benefits and medical care are provided to victims of work-connected injuries, and the costs of these injuries are passed on to the consumer through the medium of insurance. This program, as the definition of the term indicates, is or should be made up of three parts. First, adequate safety engineering, training and practices to eliminate as far as possible the occurrence of work-connected injuries; second, an adequate rehabilitation or restoration program to insure full, complete and speedy return of the injured worker to his greatest degree of earning capacity; and, third, timely payment of cash benefits to the injured worker or his dependents during the restoration period and thereafter for so long as his earning capacity has been materially lessened as a result of the accident. An adequate safety program, in turn, is made up of three parts. The physical plant, facilities, fixtures, equipment and processes should be engineered for safety and, as far as possible, eliminate all factors that can or will contribute to an industrial accident. Safety education and training of the employees, particularly the supervisory employees, is probably the most important part of the safety program. Safety is no accident, but rather is the result of conscious effort on the part of employees to perform their duties in a safe manner. The health and attitude of the employee are of material importance. In addition to the engineering and education feature, safety must, also, in some instances, rely upon enforcement. There should be a well-planned program on the part of management for rewarding safe practices by employees, and also a program penalizing the violation of established safety regulations and rules. Rehabilitation or restoration of the injured worker is second in importance in any compensation program. It is this phase of the program with which members of this Conference are primarily concerned. Restoration is used here in its fullest sense, meaning medical or physical restoration and also vocational restoration in those instances where the employee cannot return to his former occupation or employment. Of prime importance is the immediate reporting of accidents by the employer to the insurance carrier, immediate treatment by a qualified physician or surgeon, and, in those instances where the injury is serious, immediate treatment by a qualified specialist in the field of medicine involved. Concurrent with the physical treatment of the injured employee, however, should be consideration of his home environment and the effect it will have on his recovery. The psychological factor in serious disabilities is often greater than the actual disability itself, and the physician, the employer, the carrier and the Commission should recognize this and take steps to emphasize the work ability of the injured employee and the early return to employment, even though in a lessened or limited capacity. The Commission, in attempting to assume its full responsibility in this program, has recently established a Department of Rehabilitation in the Workmen's Compensation Division, and will make available to all interested parties survey and counseling functions through properly trained rehabilitation nurses and vocational consultants. The third and last component of a compensation program is the payment of cash benefits to the injured employee or his dependents during the disability period. This, too, is important and, in many instances where properly and timely made, has great therapeutic value. Elimination of concern and worry occasioned by financial stress can be of material assistance to the treating physician. Delay in payment or inadequate compensation, by the same token, can be a decided hindrance to speedy recovery. These three factors working together—safety, rehabilitation, and adequate, timely payment of compensation—should and will result in less work-connected injuries with minimum residual disability resulting from the injuries which actually occur, and a better satisfied group of employers and employees."

WILLIAM H. SEYMOUR, Vice-President, Liberty Mutual Insurance Company: "What Industry Wants From Medicine"—

"Industry will require from medicine assistance in the control of costs as regards group insurance or non-industrial incidents of sickness and accidents. Industry found itself in a somewhat similar position 30 years ago in regard to the workmen's compensation accident costs and was able through preventive and organization features to reduce the costs substantially over a period of years. From where I sit it seems that industrial medicine did not grow in this country because doctors developed it. It is growing today because industry needed it and went about getting it. Whereas the old task for industrial medicine was curative, today's need is for an entirely different orientation. Today not only the treating of the sick and the repair of work injuries are required but also the maintenance of a more or less healthy group of employees in full working effectiveness to the end that their productiveness is optimum and industries' costs are controlled."

W. G. THUSS, SR., M.D., Thuss Clinic: "How to Evaluate a Disabled Employee"—(The full text of the presentation by DR. THUSS follows this report on page 78.)

J. F. TREON, Ph.D., Assistant Professor, Kettering Laboratory, University of Cincinnati School of Medicine: "Thermal Decomposition of Compounds and the Effects on Toxicity"—

"The methods and results of investigations of the toxicity of the thermal decomposition products of five different types of material, namely, a lubricant, an hydraulic fluid, a plastic, an insecticide, and a fire-extinguishing agent, were described and discussed. The toxic effects of the exposure of animals to the products of the thermal decomposition of a synthetic lubricant, di-2-ethylhexyl sebacate containing some tricresyl phosphate, are not different from those induced by exposure to the vapor and fume of the di-2-ethylhexyl sebacate, and are no more severe than those induced by exposure to the vapor and fume created by heating an ordinary

paraffinic lubricating oil. The effects of the exposure of animals to the products of the heating of a non-flammable commercial hydraulic fluid, diphenyl octylphosphate, were similar to those induced under comparable conditions by a flammable paraffinic lubricating oil."

LOGAN T. ROBERTSON, M.D., Asheville, North Carolina: "Part-Time Employee Health Services"—(The full text of DR. ROBERTSON'S presentation follows this report on page 81.)

KIEFFER DAVIS, M.D., Medical Director, Phillips Petroleum Company: "The Fundamentals of Industrial Medicine"—

"During the recent past, the general attitude toward the practice of medicine in industry has undergone a pronounced change. At the turn of the century some semblance of curative care extended the worker injured on the job was, at best, about all that industrial medicine represented. Today, however, trained and technical workmen are no longer plentiful; neither are they the inexpensive items of industry that may be discarded at will. Management knows that the sickly employee can be costly in many ways—excessive absenteeism, accident proneness, propagation of poor attitude in his fellow workers, and the subsequent possibility of directly or indirectly causing others to be hurt, to say nothing of the emotional instability aroused sooner or later in his own family, with all its concomitants. In order to sustain the employed forces at optimal health, the present-day fundamentals of industrial medicine are premised on preventive and health maintenance practices. Examination and the proper placement of the new employee at work commensurate with his mental and physical abilities is important if the employee is to perform diligently for his employer and gain for himself that job satisfaction which makes him happy, productive, and successful on the job, at home, and in the community. Re-examination at intervals to insure this same optimal health is of equal importance. In addition to these two primary practices, there are many other functions of industrial medicine, including examination of the employee who is changing job classifications, counseling with those having health problems, examination of the employee returning to work from an extended illness, checking those exposed to potentially hazardous working environments, examination of those leaving hazardous jobs, and insuring proper and safe working environments. Keeping management apprised of its health problems and proposed solutions, as well as living and working synergistically with private physicians in the plant area, are of equal importance in the day's work of the physician in industrial medicine. It is the obligation of the employer to provide definitive medical and surgical care for any worker injured on the job. Aside from this, only limited treatment for non-job-connected health problems, which will permit the employee to continue at his work, is considered within the province and scope of the industrial physician. Since over two-thirds of our country's present population is composed of employed people and their families, it will be of great help to each practicing physician if he will become acquainted with the guiding principles pertaining to the practice of medicine as it is applied to industry."

HAROLD C. HODGE, Ph.D., Professor of Pharmacology, University of Rochester School of Medicine: "Fluoride Metabolism as Related to Water Fluoridation"—(This paper was read by Dr. F. A. Smith)—

"In the estimation of the safety of water fluoridation, reliance is placed on certain well-documented, quantitative observations of the effects of fluoride on man and animals (for example, on growth, osteosclerosis, mottling of enamel). Additional guarantees of safety are found in studies (a) of the fate of fluoride in the body; (b) of the rates and mechanisms of excretion; and (c) of the deposition and mobilization of skeletal fluoride." (This presentation was based on work performed under contract with the United States Atomic Energy Commission at the Unversity of Rochester Atomic Energy Project, Rochester, New York.)

WILLARD MACHLE, M.D., Research Associate Professor of Pharmacology, University of Miami School of Medicine: "Industrial Pulmonary Carcinoma"—

"A number of industrial agents have been under suspicion as potential carcinogens. Epidemiologic studies indicate the relative importance of several. The practice of attempting to evaluate carcinogenic properties of materials used in industries by the use of animal experimentation has led to confusion rather than clarification of the role of many. The limitations of the experimental approach were discussed."

WM. B. DEICHMANN, Ph.D., Professor of Pharmacology; John J. Farrell, M.D., Professor of Surgery; and M. L. Keplinger, Ph.D., Research Instructor, Department of Pharmacology, University of Miami School of Medicine: "Crotalus Adamanteus: Its Toxicity, and Treatment of Intoxications"—

"Crystals of Crotalus adamanteus (rattlesnake venom) were brought into aqueous solution and injected I.M. into various species. The paper discussed both the local and systemic effects produced. The approximate lethal doses, in mg./kgm., were as follows: dog, 0.64; albino rabbit, 0.94; guinea pig, 3.2; albino mouse, 10.7, and albino rat, 25.0. Fatalities occurred in 24 to 72 hours. Hydrocortisone sodium succinate (Solu-Cortef) was investigated as an antidote in dogs given 1.28 mg. of the venom per kgm. Doses of cortisone were equal to 100 mg. per dog I.V. the first day, and 50 mg. per dog on subsequent days. Results: All dogs (four) survived which received the cortisone immediately after injection of the venom. Of 20 dogs, 13 survived (65%) treated with cortisone two hours after injection of venom, while nine of 12 dogs (75%) survived which received the antidote four hours after the venom. No dog received supportive treatment. The significance of these results is evident." (This investigation was partially supported by a grant made available by the Upjohn Company, Kalamazoo, Michigan.

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The venom was purchased from the Miami Serpentarium, Miami, Florida.)

J. L. RADOMSKI, Ph.D., Associate Professor, Department of Pharmacology, University of Miami School of Medicine: "Mechanism of Action of Snake Venom"—

"Chemical investigation of the nature of Naja flava (cobra) venom led to the development of a method for the clean separation of this venom into two electrophoretically distinct fractions, one of which contains proteins which are highly mobile, highly basic and represent 95% of the toxicity (Fraction I), and the other of which contains proteins which have low mobility, lower isoelectric points, and represent 5% of the toxicity of the crude venom (Fraction II). The Lecithinase A activity, the proteolytic activity, the inhibitory activity against succinic dehydrogenase, the ATPase activity, the DPNase activity, and the ribonuclease activity of both fractions were investigated and found to exist mostly in Fraction II, the less toxic fraction. This led us to the conclusion that these enzyme activities are not directly related to the primary toxic action of cobra venom. The physiological effects of Naja flava, Crotalus t. terrificus and Crotalus adamanteus venoms on animals were also discussed."

C. A. D'ALONZO, M.D., Assistant Medical Director, E. I. du Pont de Nemours and Company: "Occupational Psychiatry Through the Medical Periscope"—

"Occupational psychiatry, as a branch of occupational medicine, appears well rooted for a continuing growth. At least four manufacturing companies employ a full-time psychiatrist, with a steady increase in the number of part-time specialists in this field. Although well received by management and most employees, there are still a minority who view it with reluctance. Reasons were discussed for this attitude. The functions of the occupational psychiatrist and his relationship to the occupational medical unit also were discussed. Slides showing the various functions of an occupational medical department, and a comparison of the different practices of psychiatry were used; and the most common psychiatric situations among employees were listed. An appeal is made to the private psychiatrist to cooperate with the occupational Medical Department to the end that the needs of the patient will be more fully realized." (See Dr. D'Alonzo's article on this subject, *Indust. Med. & Surg.*, 25:10, 466 (October) 1956.)

RAFAEL PENALVER BALLINA, M.D., University of Havana School of Medicine, Havana, Cuba: "Diagnosis and Treatment of Manganese Intoxication"—

This was a colored film, presenting a miner who suffered severe manganese intoxication. Before treatment was instituted, this individual displayed paralysis of the lower extremities, rigidity of facial muscles, chills, hyper-reflexia, and torticollis. The following drugs were administered: Versenate (Riker), Parpanit (Geigy), Tolserol (Squibb), Natrascorb (U.S. Vitamin), and dextrose. The patient recovered almost completely. Experimental investigations are in progress to elucidate the mechanism of action of manganese intoxication."

HENRY F. SMYTH, JR., Ph.D., Administrative Fellow, Mellon Institute of Industrial Research, University of Pittsburgh: "The Communication Lines and Problems of a Toxicological Laboratory Working for Industry"—

"Over and above the question of sound technical methods, there are three outstanding problems of a toxicology laboratory working for industry which are absent or trivial in other toxicology laboratories. Its work must be paid for with profits, but it should have the freedom to study many compounds which will never earn a profit. In order to handle urgent problems expeditiously, its staff and facilities should be larger than can ordinarily be utilized fully. It should learn of the plans of research and development laboratories before these groups believe they require toxicological opinion, and it should see that toxicological data are in the hands of all who require them in terms which are meaningful to the recipients, even when they do not recognize their need. Only when some approximation to the solution of these problems is attained is the industrial toxicology laboratory reasonably well fulfilling its functions."

RALPH JONES, JR., M.D., Professor of Medicine, and Ulfar Jonsson, M.D., Instructor, Department of Medicine, University of Miami School of Medicine: "Toxic Effects of Chemicals on the Hemopoietic System"—

"In the past 50 years there has been a steady increase in serious hemotoxic reactions owing to exposure to drugs and chemicals. Until recently, the mechanisms by which these reactions occurred have been obscure. The first observations made on hemotoxic reactions were primarily in connection with aniline derivatives and were often associated with methemoglobin formation and formation of Heinz bodies. In recent years these observations have been extended greatly, and it has also been found that immunologic mechanisms may play an important part in causing both thrombocytopenia and hemolytic anemia due to chemicals. It has also been found that enzyme deficiency in the individual may be the cause of drug hemolytic anemia in some cases. Interference with the metabolism of folinic acid or vitamin B_{12} also is becoming obvious as a cause for anemia in certain drug anemias. These various mechanisms of hemotoxic reaction were discussed and illustrative cases reported."

HERBERT E. STOKINGER, Ph.D., Chief Toxicologist, Industrial Hygiene Field Headquarters, Public Health Service: "Importance of Ozone in Air Pollution, and Factors Influencing Its Toxicity"—

"Evidence was presented for the highly toxic and lethal nature of ozone, based upon mortality data and observations of histologic, physiologic and biochemical changes. Exposures of four hours were lethal to rats and mice at 4-6 ppm ozone by volume; death from right heart failure was due to pulmonary edema and hemorrhage. Lower, tolerated concentra-

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tions gave rise to detectable amounts of pulmonary exudate after a considerable interval which eventually subsided in 48-72 hours. The lung weight did not return to normal for several weeks, however, apparently as a result of macrophage migration and inward diffusion of protein. The tracheal epithelium was hyperplastic. Repeated exposures at noninjurious or slightly injurious levels left the animals in a state in which they could tolerate lethal doses of ozone, but were not refractory to progressive tissue change, fluid flow and altered respiratory pattern. Respiratory volume and oxygen consumption progressively decreased with repeated exposures; lysozyme activity in the serum appeared to be enhanced, but pulmonary alkaline phosphatase and 5-nucleotidase activity were decreased. Daily repeated exposures of 1 ppm for one year gave evidence of permanent injury to the bronchioles (fibrosis and bronchiolitis) in the mouse, rat, hamster and guinea-pig, but was scarcely evident in the dog. In attempting to evaluate the public health hazards from exposure to lowgrade ozone concentrations, seven factors influencing ozone toxicity were studied. Four of these, youth, physical exertion, respiratory infection, and alcohol, tended to augment the injurious response; the remainder, intermittent exposure, premedication, and pre-exposure reduced the injurious effects of ozone."

BEVERLY L. VOSBURGH, M.D., Consultant, Health Services, General Electric Company: "Short Wave Radiation"—

"Tests performed on animals indicate that damage can be done to live tissue exposed to microwave radiation. The amount of damage appears to depend primarily upon the wavelength, the time of exposure, and the field intensity. The available data are meager. There is no existing authoritative standard to define the limits of time, field intensity, and wavelength under which exposure to microwaves could be injurious to the human body. There are no generally recognized safety practices that will offer maximum protection from microwave radiation to personnel. (A graph illustrated the data on intensity and time exposure relating to six cataract cases—five animal and one human.) In recommending safety measures a factor of safety of 100 is used in reference to a former standard. Instruments and measurement techniques are available to implement this safety factor. Current biological studies may justify the suggested safety factor."

HORACE W. GERARDE, M.D., Ph.D., Head Toxicologist, Esso Research and Engineering Company: "The Toxicity and Metabolism of the Phenylalkanes"—

"Alkyl derivatives of benzene are extensively used in industry as solvents for paints, plastics, pesticides, and protective coatings, as constituents of automotive and aviation gasoline, and as starting materials for synthesis in the chemical industry. Because of their structural chemical relationship to benzene, this class of compounds is of great interest to the industrial toxicologist, physician, and hygienist. Toxicological studies conducted in Europe and in this country indicate that the phenylalkanes do not affect the bone marrow and cause mucous membrane irritation at atmospheric concentrations which are below the levels which might cause chronic toxicity. Evidence to support this and data comparing the toxicity and metabolism of benzene with certain alkyl derivatives were presented. It is suggested that this class of compounds be referred to as the phenylalkanes rather than the alkylbenzenes to connote that toxicologically and biochemically they are not similar to benzene. Phenylalkanes is preferable for semantic reasons, also, since the term does not suggest any association with benzene."

EDWARD D. PALMES, M.D., Associate Professor, New York University College of Medicine: "Factors Influencing Deposition of Aerosols in the Lungs"—

"Deposition of air-borne particles on the walls of the respiratory tract is predominantly influenced by three primary factors. The inertia of the particle as it moves along in the air stream may impact the particles whenever the air stream changes direction. Gravity causes the particles to settle out of the air in the tract and thus be deposited. The third major factor is the random bombardment of the particles by the molecules of the supporting air: this causes Brownian motion in the particles. Each of these acts on the aerosol particles to influence the extent and the locus of deposition. All can be related to physical measurements on the particles. The complete description of factors influencing aerosol deposition involves, in addition, physiological and anatomical characteristics of the subject. The effect of these was discussed briefly."

THOMAS TUSING, M.D., Medical Director, Hazelton Laboratories: "Demyelination in Relation to Organic Phosphate Insecticides"—

"Early reports indicated that at least one organic phosphate, triorthocresylphosphate, was capable of producing paralysis in humans due to demyelination of the peripheral nerves and spinal cord. Recent reports indicate that several other organic phosphates, two of which are insecticides, can produce this syndrome in animals. Human intoxication, with residual paralysis, has occurred with one such insecticide. Workers in this field have shown no correlation between the ability of these compounds to produce demyelination in relation to chemical structure or their ability to inhibit enzyme activity of cholinesterases. A review of this literature was presented along with current techniques in evaluating this finding by *in vitro* and *in vivo* studies."

THE FORMAL sessions concluded with a talk by C. BOYD SHAFFER, Ph.D., Chief Industrial Toxicologist, American Cyanamid Company, on "Toxicological Investigations Related to the Artificial Coloring of Oranges."

After lunch, at which the Conference people were guests of Eastern Air Lines, there was a demonstration of first aid at Eastern, by Medical Director, HOWARD K. EDWARDS, M.D., followed by visits to the Pharmacological Research Laboratory, South Miami, and the Miami Serpentarium. At the Banquet, Saturday evening, the Guest of Honor, and Principal Speaker, was E. S. JONES, M.D., President, Industrial Medical Association.

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How to Evaluate a Disabled Employee

W. G. THUSS, Sr., M.D.
Thuss Clinic, Birmingham, Alabama

THE SUBJECT of this paper, "How to Evaluate a Disabled Employee," is too comprehensive to be covered in so short a time. It is like cooking an elephant. First it must be cut in small pieces.

Probably most of us have an idea as to the meaning of "able" and "disable," but to my surprise I could not locate either of these words in the 22nd Edition of the American Medical Dictionary. The American College Dictionary defines "disability" as the lack of competent power, strength, physical or mental ability; incapacity; unable to perform; weakened; a cripple.

Disability, therefore, results from many causes or combination of causes—congenital defects, illnesses, accidents, etc.

This discussion will be limited to disability evaluation as related to employment subject to the legal interpretation of our various states. I do not have any magic formula, and I want to emphasize that there is no easy answer that will please everyone.

Our Clinic is devoted entirely to industrial medicine and surgery. Over the past 10 or 15 years, the traumatic problems have decreased, with a vast increase in the medical problem. As Medical Director of two large insurance companies, and as Zone Surgeon for practically all of our casualty companies, I often review files containing what seem to be contradictory medical reports all related to the same case. If the doctors are so far apart with their ideas and conclusions, how is the claims man expected to arrive at an equitable adjustment?

I would like to call attention to a few basic and simple suggestions, whereby you can work out your own pattern for disability evaluation, and, instead of finding it a headache, there is a chance that it would be easier than you would expect.

DISABILITY evaluation is the basis for all compensation awards. It might be well to mention briefly the essential difference between the various workman's compensation acts and the Federal Employer's Liability Act. Many states have different waiting periods, as well as a limit on medical expense. However, 12 states provide medical aid without limit as to time or amount. The Federal Employer's Liability Act has no limit on medical expense and no fixed minimum or maximum payment. Larson pointed out that the usual compensation act included the following features:

1. The employee is automatically entitled to certain benefits whenever he suffers a personal injury by accident arising out of, and in the course of, employment.

2. Negligence and fault are largely immaterial, both in the sense that the employee's contributory negligence does not lessen his rights, and in the sense that the employer's complete freedom from fault does not lessen his ability.

3. Coverage is limited to a person having the status of employee as distinguished from independent contractor.

4. Benefits include hospital and medical expense, and cash wages, usually one-half to two-thirds of the average weekly wage. In death, benefits for dependents are provided. Arbitrary maximum and minimum limits are ordinarily imposed.

5. The employee and his dependents, in exchange for these modest but assured benefits, give up their common law rights to sue the employer for damages for any injury covered by the act.

6. Administration is typically in the hands of administrative commissions, and as far as possible, rules of procedure, evidence and conflicts of law, are related to facilitate achievement of the beneficent purposes of legislation.

7. The employer is required to secure his liability through private insurance, state fund insurance in some states, or 'self insurance.'

Medical opinion may not agree with the desires and interests of the injured employee; yet this opinion must be unbiased and must indicate disability in terms of percentage and duration. Total disability does not necessarily imply absolute physical incapacity, but it does prevent a workman from continuing regularly at his own occupation. A total permanent disability implies that a worker cannot resume any type of gainful occupation, while a partial permanent disability limits a worker permanently in some degree. Medical evidence, as presented in court, must be complete as to history, physical findings, type and length of treatment, an estimate of disability, and future outlook. Medical testimony deals with uncertainties, and the medical witness should not only be in a position to evaluate the injury, but also be ready to answer questions related to the possibility of aggravation of pre-existing conditions.

Disability evaluation should be divided into two parts:

Number 1 covers the temporary disability;

Number 2 should be devoted to a consideration of permanent disability.

Presented at the Second Symposium on Industrial Medicine and Toxicology, University of Miami School of Medicine, December 14-15, 1956.

In evaluating either temporary disability or permanent disability it is important to keep the following in mind:

1. Diagnosis.
2. Record of treatment. This is important from the medical as well as the legal standpoint because the examiner must determine that no further treatment of any kind can change the then present result.
3. Examinations by other physicians or specialists in their particular field.
4. A record of x-ray examinations and other tests.

Temporary disability ceases when, in the opinion of the attending physician, the injured patient under treatment is able to return to work. If recovery has reached a fixed position, the question of permanent disability may then present itself.

Permanent disability can be divided into three parts:

1. The evaluation or loss, by amputation, of a member, or the functional impairment of a member, resulting from injury.
2. Consideration of disability as based on the loss of the use of the body as a whole.
3. Reduction in earning capacity and employability. Disability with regard to workmen's compensation with few exceptions, deals not only with social or economic standards, but with functional loss as well.

THERE is no yardstick or schedule that can adequately define and classify all the variations of physical disability. Each case must receive individual consideration. Disability is based on function, and the degree of disability is determined by the ability to work. Disability evaluation not only demands experience, but also especially requires knowledge and training.

McBride suggests the following grading "for average" as useful in classifying the seriousness and extent of disability:

1. Low degree or minor: 5% to 20%.
2. Moderately low minor: 20% to 35%.
3. Moderate degree to medium high: 35% to 50%.
4. High moderate to low major: 50% to 65%.
5. High degree major: 65% to 80%.
6. Maximum: 80% to 100%.

Eye injuries and visual impairment can be estimated with reasonable accuracy, and an "Appraisal of Loss of Visual Efficiency" was accepted as a standard method by the Section of Ophthalmology of the American Medical Association in New York in 1940. Unfortunately no such accurate schedule can be set for head injuries, back injuries, chest injuries, and many others, although we are charged with the responsibility of estimating all of these cases.

A survey was made at the Boston City Hospital on 200 selected head injuries out of 430 consecutive admissions. Those under 15 years of age and over 55 were excluded, as well as vagrants and chronic alcoholics. These 200 cases were closely followed, and at various times examined by neurologists, psychiatrists, social workers, and others. The majority were "closed head injuries." Eighteen had skull fracture demonstrated by x-rays. Fifty-five percent complained of symptoms in convalescence: headache, dizziness, and psychiatric symptoms ("post-concussion syndrome"). Thirty of these cases did not return to full occupation by reason of other injuries not related to the head injury. Of the remaining 170, 136 returned to full occupation in two months. Sixteen returned in the third and fourth month; (four in the fifth and sixth months; nine between the sixth and ninth month, and five at a later date. In each case, features indicative of severe injury were analyzed, namely: prolonged disorientation, abnormal neurological findings, blood in the spinal fluid.

These symptoms, associated with prolonged disability either severe or mild, were predominately psychic and related to anxiety. Even after severe injury, cranial nerve paralysis, dizziness, headache, and personality changes accounted for only a minor part of the disability. Intellectual disorder played no significant part.

Kessler suggests that differences in evaluation are frequently due to differences in emphasis. One physician may consider the structural factors, another physician the economic, and the third the social. The ideal, of course, is a coordination of these into a single evaluation. The factors to be considered in determining the degree of disability are:

1. Reduction of earning capacity.
2. Loss of efficiency.
3. Presence of a structural or anatomic defect.
4. Presence of a cosmetic defect.
5. Reduction in the ability to secure employment.
6. Unfavorable change in personality.
7. Functional loss.

Some, all, or none of these factors may be present where there is a question of disability evaluation.

IN THE following summary, an attempt will be made to outline a method which will enable the examining physician to submit a report for disability rating.

It will be necessary to keep in mind the variations of state laws, and the flexibility of interpretation, either by industrial commissions or by courts. I want to make it clear that the doctor only serves in a medical capacity, and as such supplies medical information for adjusting the claim.

I am the examining physician for the Railroad Retirement Board. Instructions in the letter for

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appointment clearly advise the claim is not to be discussed with the injured party. In my opinion, this idea should embrace all disability evaluation. Inadvertent remarks during the course of the examination are interpreted incorrectly, and it is folly for the examining physician to express an opinion as to the monetary value of a claim. It has been found that the less said at the time of examination, the fewer opportunities develop for confusion. As a rule, the examination—while completed from a physical standpoint—has not had time to include various laboratory tests and x-rays, and the claimant can be told that until all the medical facts are assembled, no medical conclusion can be drawn. I have come in contact with claims men, industrial commissions, courts and lawyers, and it is my firm conviction that they must have accurate, unprejudiced and unbiased medical information. From this point on, it is up to them to establish the value.

1. Obtain a full medical history, not only related to the present condition under consideration, but also other medical information as well. Question the patient as to previous injuries, whether received while in Armed Services, and, if so, what disability was allowed.

2. If the patient has had medical attention by another physician, written statement from this doctor will be of great value. X-ray and laboratory reports should be included. X-ray films taken elsewhere at the time of injury, and during the period of recovery, can be compared with those taken at the time of disability evaluation.

3. The examining physician should have a conference or consultation with the patient's attending physician. This would serve many purposes. There would be a better understanding between the attending physician and the examining physician. After discussion and comparison they should be in reasonable accord as to the disability evaluation.

4. All measurements of joint motion should be made using a protractor or goniometer.

5. Record exact amputation level, using x-ray if necessary, particularly in the case of fingers where the same finger on the other or uninjured hand can be placed on the film for the purpose of comparison.

6. In cases involving the upper extremities, record the major hand. All measurements of function should be recorded as a fraction whenever possible: the injured side as the numerator, the uninjured side as the denominator.

7. In cases of injury to a joint or to structures between the joints, record the function of the structures involved, including the joints above and below, together with the function of the extremity as a whole.

8. Note any condition antedating the injury and which in any way, contributes to, or increases the disability.

9. Deformity or disfigurement as a rule, is only compensable if, and to such a degree that, it interferes with employment. This should be described, as it may be considered in disability rating.

10. All subjective symptoms should be carefully recorded, and in detail.

11. Atrophy can best be indicated by measuring the circumference of the affected part and comparing it with the uninjured side. Comparative measurements should be made at the exact level, and, in the case of an extremity, include the area above and below the injury.

12. Muscle power should be checked, both by manual resistance and by use of a dynamometer.

REGIONAL examinations should include the following:

1. *Head.* Check subjective complaints. Record neurological findings. Record and note deformity and disfigurement. In this connection, and with particular reference to the face, concerning scars, we have found that photographs taken at the time of our examination to accompany the report are of great value. Abnormality of the eyes, ears, nose, and mouth might be recorded under this section.

2. *Neck.* Examination of the neck, including subjective complaints, deformity, muscle spasms, degree of motion, and any atrophy, should be carefully made and recorded.

3. *Chest.* Examination of the chest includes subjective complaints, deformity or disfigurement, atrophy, and sensory changes.

4. *Abdomen.* Examination includes subjective complaints, deformity or disfigurement, atrophy, scars, masses, hernia, or other abnormalities.

5. *Back.* The examination of the back includes subjective symptoms, the general alignment with the exact location, extent and degree of curvature, pain on movement, tenderness on pressure, muscle spasm, measurements of function, and routine tests including the straight leg raising test and the heel-to-buttocks test.

6. *Shoulder.* Record subjective complaints, deformity, crepitus, atrophy, measurement of joint motion, and major or minor arm.

7. *Upper Arm.* Record subjective complaints, atrophy, muscle power, deformity, sensory changes, function of shoulder and elbow.

8. *Elbow.* Record subjective complaints, deformity, crepitus, atrophy of muscle group above and below elbow. Evaluate strength in arm, and measure joint motion.

9. *Forearm.* Record subjective complaints, atrophy, deformity, sensory changes, and function in elbow and wrist.

10. *Wrist.* Record subjective complaints, deformity, crepitus, joint motion, grip in hand, and sensory changes.

11. *Hand.* Record subjective complaints, deformity, to include carpal bones, fingers, and

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condition of nails and atrophy. Record joint motion in each finger, both to flexion and extension, using a goniometer.

12. *Pelvis.* Record subjective complaints, deformity, secondary scoliosis, shortening of lower extremities, sensory changes, and disability as related to back.

13. *Hip.* Record subjective complaints, deformity, crepitus, atrophy. Record measurements of motion and disability as related to leg.

14. *Thigh.* Record subjective complaints, deformity with emphasis on mal-alignment and shortening, atrophy, muscle power, sensory changes, and disability in hip and knee.

15. *Knee.* Record subjective complaints and deformity. Make record of measurements and degree of motion, sensory changes, and disability in thigh and leg.

16. *Leg below Knee.* Record subjective complaints, deformity, mal-alignment and shortening, atrophy by measurement, muscle power, sensory changes, and disability in knee and ankle.

17. *Ankle.* Record subjective complaints, deformity, swelling as determined by measurements and comparison, crepitus, measure of motion and comparison, sensory changes, and disability as related to the leg.

18. *Foot*—to include os-calcis. Record subjective complaints, deformity, degree of movement, sensory changes, painful calluses, bunions, etc., not present on other foot.

19. *Toes.* Record subjective complaints, deformity, swelling, degree of motion, condition of nails, sensory and trophic changes, painful calluses, bunions, etc., not present on opposite toes. Record disability in the foot.

IN CONCLUSION, you are aware that I have been dealing with a highly controversial subject. The trend of legislation has been to grant increasing benefits and rights to employees. When an employee suffers an injury, he feels that his employer should take care of him. The injured employee is not interested in the technicalities of commission or court procedure. He knows only that he has a disabling injury and is concerned solely with the cure and compensation during the time his disability lasts. In evaluating a disability, it is usually found that the simpler the method, the better the result.

There is no substitute for training, experience, and sound judgment. An early determination of the degree and type of injury is a prerequisite to the early and correct evaluation of disability. This early evaluation of a disability insures the elimination of uncertainty on the part of the patient, a more speedy recovery, and an earlier return to work.

Part-Time Employee Health Services

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HEALTH programs, as currently practiced in industry, vary considerably in scope and objectives. We believe that the main emphasis in a health program should be on the preventive aspect and, if possible, positive constructive phases of health maintenance. Though details and execution of such a program vary from industry to industry, basic principles are applicable to all programs. The application of these principles in the past has successfully been instituted in large Medical Departments where full-time personnel and adequate equipment have been available. The majority of industrial employees work, however, in the smaller plant, and the mechanics of bringing comprehensive medical programs to the smaller plants will be our concern here. The type of program I shall describe has its main emphasis on the non-therapeutic phases of industrial medicine. Naturally, attention to the sequelae of major accidents and industrial illnesses is of importance; however, the prime objective is prevention. To bring the techniques of a preventive program to the small plant presents financial problems to the employer, and it is through a multi-plant program that this problem can adequately be solved. Management-sponsored programs on a cooperative basis have been successfully operated. I would prefer, however, that the initiative rest with private practice medical sponsorship.

Unique to our method is the utilization of mobile medical units and automated record systems. The mobile medical units are used for performance of periodic health maintenance examinations. We start with this phase of the medical procedure rather than the apparently more logical preplacement examination, since, in most instances, we have found that the institution of a program like this occurs after the plant is already in existence and the opportunity for initial preplacement examination is usually not possible. The equipment which our group has designed and utilized makes it possible to bring the examination site directly to the employee group. The units are self-sufficient in the sense that the accompanying generators provide electric power, heat and/or air conditioning as well as water

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supply and sewage disposal. They are equipped with photoroentgen units, electrocardiographs, sound-treated rooms for audiometric studies, visual testing facilities (Ortho-Rater) Harrington-Flocks visual fields, screener and tonometers. Facilities for laboratory analyses are available and can be made as broad as desired. At present, we routinely perform modified glucose tolerance, urinalysis, hematocrit and buffy layer, blood typing, and serologic determination. Four examining rooms are available, with self-contained lavatories. Pelvic examinations are performed routinely for women with the taking of cervical and vaginal smears for cytologic study. The performance of the tests listed, as well as a physical examination and medical history, can be accomplished in approximately one to one and a half hours for each employee, and with the physical units described 80 examinees per day can be processed. With the examinations performed directly on the plant site, the total employee time off the production line is kept to a minimum, and the obvious savings to the employer of employee time and reduced machine production are considerable. All information gathered — whether it be historic, measuring data (such as height, weight and blood pressure), results of interpretive procedures (such as x-rays and electrocardiogram, or physical examinations) — is directly recorded on IBM mark sense cards. These cards are automatically punched and then serve as vehicles for the automatic production of clinical records.

This periodic health maintenance examination (or more ideally, the preplacement examination) can be the starting point for the individual's medical log. It gives the plant Medical Director his base line evaluation, and it is his medical entree to rapport with the employee. It has been our experience that more than 75% of the examinees will have medical defects which require attention, and approximately one-third of these will be of a medically significant nature. The plant Medical Director then has the opportunity to counsel the employee, and to make specific referrals to the individual's personal physician. Vigorous follow-up is, of course, the key to a successful program. The medical report which was automatically generated is also available to the personal attending physician.

The automated record system utilized also makes it possible to prepare comprehensive analyses of the medical findings for the entire population examined. These analyses are immediately useful to the plant Medical Director in pointing up areas of particular import that might not otherwise be obvious; for example, the finding of a higher than average incidence of obesity or hypertension in a given industrial environment. Also generated automatically is a statistical report to management of the over-all health status of its employee population group. It might be appropriate at this point to mention that this report to management does not identify by name the findings for any individual. We believe most strongly that medical confidence must be preserved in examinations of this type and that they should be voluntary. It has been our experience that when these provisos are clearly defined, the voluntary participation rate has consistently averaged better than 90%. Immediate comparative analyses also are available showing the experience of findings in the given plant in comparison with other plants of comparable types or groups within the plant.

Day-to-day in-plant medical services are performed on a similar sharing multi-plant basis. The services of the visiting nurse and physician will vary in hours of attendance depending upon many obvious factors, such as the size of the plant, as well as its particular production problems and the age and sex distribution of its population.

FOR ANY plant, but particularly for the smaller plant, the motivation of the nurse and physician is critical for the success of the program. Familiarity with the employees and their working environment is necessary for industrial professional personnel, and this cannot be achieved simply by holding sick call. An essential part of the visiting professional time must be spent physically inside the plant. Medical familiarization is simplified by the examination program as previously outlined. The report of these findings, as well as any subsequent periodic examination, is on file at the plant dispensary, and by an appropriate visible coding system significant medical conditions can be signalled so that the employee dropping into the dispensary for otherwise unrelated conditions, such as mild respiratory complaints or minor trauma, can be identified immediately as diabetic, for example, and the nurse thereby has an opportunity to check regarding adequacy of attention to necessary medical follow-ups and regimens. The services of other professional specialists, such as psychologist and psychiatrist, toxicologist, and industrial hygienist, can be incorporated into this cooperative program. The results of such testing procedures as visual acuity determinations and audiometric analyses, then, on a plant-wide basis can be coordinated with the efforts of the safety control, visual conservation and hearing conservation programs.

Reporting forms for in-plant visits also are recorded on punched cards. These cards make it possible to prepare periodic experience reports to management, as well as medically useful incidence findings. Analyses are performed for the population group and also are summarized annually for the individual, and are compared with the results

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of the periodic examination. The two main analyses complement one another; the periodic examination results being of value to the physician at the time of individual dispensary visits, and the compilation report of visits to the dispensary being available at the time of subsequent periodic examinations. The emphasis we have placed upon record systems should not be misinterpreted to imply that they have an importance of their own. We believe that the automated record systems utilized provide the physician with vital information which would not otherwise be readily accessible in the small-plant program and which serves as an essential tool for his day-to-day activities. On the broader scale, we also believe that the industrial physician is charged with responsibility for health levels of population groups, and that it is not possible to assess this status on the casual observational level. Quantitative analysis of a statistical nature is necessary for this. We also believe that the main emphasis in a preventive health maintenance program is one that aims toward early detection of disease, as well as the attempt at prediction of future candidates for disease states. The card method which we have described permits the recording of measurement of multiple variables in apparently normal individuals who will then be followed on a long-range basis and the repository of coded data is immediately available for research.

IN CONCLUSION, a method has been presented which makes it possible to bring to the small industrial plants a comprehensive medical program which would otherwise be unfeasible for them. The utilization of mobile equipment for periodic examinations and the use of an automated record system are described as supporting tools for the physician and nurse. The central and key role of these individuals in the success of the program is emphasized on a personal employee-physician relationship basis. The methods used, however, also permit considerations of population groups as candidates for medical efforts.

Executive Dump

HIGH ABOVE the city, in the opulent aerie he modestly calls an office, the business executive of film and fiction does his skullwork amid trappings that would make Cleopatra's barge look like an excursion steamer. But in real life, the Executive Furniture Guild disclosed last week, the average executive suite is a dump. In a survey of 1,000 executive offices in more than 40 U.S. and Canadian cities, the Guild found that the typical layout is "about as inviting as the inside of a boxcar, features drab beige throughout, vinyl tile floor, Venetian-blind tapes of a too-dark shade of brown. The massive oak furniture is awkward, outmoded and impractical. No draperies. Several unimportant pictures hang from the wall as if they had landed there by accident. Desk accessories coordinate with nothing. About the best that can be said is that it is clean and the furniture is in good repair." Less than half the offices were carpeted. In 58%, "unattractive exposed elements" (meaning heating fixtures) are visible. In 72% of the offices, sniffs the report, cramped interiors do not even suggest the "acumen" or "importance" of the executive. Probable reason: in two-thirds of the offices, the décor (or lack of it) was perpetrated by secretaries, wives, friends and "other well-meaning nonprofessionals." The cumulative effect of crooked pictures and uncorrelated desk accessories, reasons the survey, is to expose the executive to "countless minor irritations dripping constantly on the nerves." Since businessmen spend half their waking lives in offices, they soon "succumb, in the prime of life, to ulcers, nervous breakdowns and heart attacks." Well-designed furnishings, on the other hand, "pay off in the health, happiness and peak efficiency of the executive." They will also be around when his successor moves in.

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New Challenges in the New Industrial Era

HOMER N. CALVER, Editor
Health Officers News Digest, New York City

A FEW MONTHS AGO three major groups of insurance companies announced that they were ready to provide insurance coverage for *all the risks* to life and property which the use of atomic power in industrial plants may bring. They are also willing to insure against injury to people and property in surrounding areas. This decision by insurance companies to cover the hazards of atomic radiation was a significant landmark, because no company could afford to proceed in this field until such insurance was available.

This is one of three indications of the tremendous increase in the importance and scope of industrial environmental health problems that are going to face us in the near future. Two other developments also promise changes and increases in responsibility. They are the headlong growth of industry and the up-grading of the labor force.

There are more people gainfully employed in industry today than ever before in history. This growth appears likely to continue, even though the labor supply is not growing as fast as the population. As plants multiply and expand, as more new things are made, the traditional problems of environmental health increase and new environmental health problems arise. Assistant Surgeon General Mark Hollis of the U. S. Public Health Service has pointed out one typical chain reaction that results from growth—"more plants use more water and greater use of water leads to greater water pollution." He also, paraphrasing the World Health Organization's definition of health, defines environmental health as "a state in which man's environment contributes to his physical, mental and social well-being and is not merely the absence of environmental hazards."

The third development which emphasizes the growing need for more attention to environmental health is the rapid turn that American companies are taking toward super-charged Phi Beta Kappa labor forces. Vannevar Bush and others have pointed out that the most serious shortage we are likely to run into in the future is a shortage of the highly trained people needed to design, operate and service the new machines of industry.

Our old idea was that machines replace manual skills. However, if we consider skill in terms of judgment and understanding of complex tools, the picture is different. It takes a great deal more skill to set up, operate and service an electronic computer than to run an adding machine.

This up-grading is beginning to affect all industry, especially as automation advances. Some people assume that automation decreases the need for labor. But this is not true. A recent survey by the International Association of Machinists showed that in 364 metal-working plants which had installed some form of automation total employment had actually increased. With more than 1000 companies now making automation equipment, automation is affecting all fields and levels of activity. Indeed, one author has pointed out the possibility of automated management.

Illustrating this point, here are some of the jobs advertised in last Sunday's *New York Times*. They are in fields not even heard of when you and I first began to look at the help wanted columns. They include autonetics, miniaturization, gyroscopics, digital computation, telemetric guidance, environmental research, electronic packaging, inertial guidance, nuclear engineering and selling, air-borne analog design, computor set-ups and solution analysis, and transistorization. And these are in addition to the traditional backlog of demand for highly-paid secretaries, stenographers, bookkeepers, accountants, salesmen, clerks, typists, addressograph operators, draftsmen, etc. For all these people we have the prospect of still shorter hours, earlier retirement, more holidays and paid vacations, and the three-day week end. Apparently the day is not far off when all workers will be white collar workers.

This competition for highly-trained, mobile, and ambitious workers is putting terrific pressure on management for unsurpassable working conditions. Some union leaders in their bargaining already put fringe health benefits ahead of wage increases. The workers themselves, though

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they will sometimes resist medical care and services, will demand perfect environmental protection. And this new Phi Beta Kappa labor force will have a very clear idea of what constitutes good working conditions. Peter Drucker states that a certain industry which now absorbs 300 college graduates every year estimates that it will need 7,000 new college graduates annually just to keep going after it is automated. The kind of working environment you offer these cum laude graduates may determine whether you get them or your competitor gets them.

Substantial absenteeism in such a labor force is a cost that modern industry cannot tolerate. It was one thing to have a couple of men absent in a shift depending on simple manual labor. Vacancies could usually be filled, and since it was a hand operation not too much was lost. But now the capital investment per employee is becoming so large that the illness of a single worker may be as costly as the absence of a movie star in the shooting of a big film. Even the absence of workers well below the movie star level can reduce the earning power of large chunks of invested capital.

Peter Drucker has also pointed out that, "Today every American at work supports himself (or herself) and one-and-a-half other people besides. Twenty years from now every American at work should produce enough to support, at today's standard of living, himself and three-and-a-half other people. And he will have to do this in fewer working hours. To achieve this, productivity will have to increase 40% in the next 10 years; it will have to be almost doubled in the next 20 years." This increased productivity probably cannot be achieved without creating the type of ideal environment referred to by Mark Hollis.

According to Dr. James H. Sterner, of the Eastman Kodak Company—"personal illness and injury causes 60 or more times as much absenteeism as is due to direct occupational causes."

No wonder, therefore, that Dr. Leonard A. Scheele, former U. S. Surgeon General, believes that "the horizon of the field of industrial health has expanded in recent years from a circumscribed interest in the control of industrial health hazards to a comprehensive approach to total health needs of the employee population!"

With today's high stakes, these total health needs which are now the concern of a dozen or more people—from industrial nurses to production engineers—can no longer be solved piecemeal. Coordinated planning is increasingly needed at top management level to deal with the health problems within industry, as well as with the coordination of industrial health programs with community health programs.

Against this background, let us take a look at a few pressing environmental health problems.

In-Plant Environmental Health

IT IS NOT NECESSARY to elaborate here on the precautions taken against specific industrial hazards. Poisonous fumes, gases, dusts or other special hazards are usually recognized and dealt with by traditional means. However, in this new atomic age, obvious precautions are sometimes overlooked. I recently visited a new laboratory building in which radioactive materials are to be handled. The architect had dutifully provided an exhaust system to draw off the dangerous radioactive wastes. But he made a very bad mistake. This lethal waste was being discharged at breathing level into a busy parking lot next door.

Many new problems such as this will arise as American industry advances—making new things, making and distributing more of everything, while it marches on toward complete automation. Meantime, we must recognize that we have not yet dealt adequately with some existing problems—the problem of waste, for example.

Pollution

THERE is probably no facet of today's economy which affects sanitation more directly than the economy of waste. Indeed, today's American economy is based on waste. We no longer sharpen our razor blades. It is against the law to re-use certain types of containers. We are persuaded that our autos, our clothes, and our houses, are outmoded even before we have finished paying for them. Compared with the thought which we have given to production, we have given an infinitesimal amount of thought to the handling of the waste which is the end product of that production. As production continues to increase and diversify, the problem of waste disposal becomes more and more serious, not only at the production level but at the consumer level as well.

The traditional method of waste disposal is by dilution. Gaseous, and solid wastes are poured forth into the sky from many manufacturing operations to be diluted with air. Other industrial wastes are discharged into streams, lakes and oceans to be diluted with the water, and wastes of all kinds are spewed forth on the ground by both producers and consumers where it is fondly hoped that time and circumstance will deal with them. Yet, as with the air, the capacity of the water and earth to absorb these wastes is not limitless. It has, in fact, already been exceeded in many places.

The increasing use of fossil fuels—coal and oil—in industry and on the highways has been accompanied by a rise in the incidence of lung cancer and apparently of skin cancer, according to Dr. Paul Kotin, of the University of Southern California School of Medicine, and others. He places air pollution ahead of cigarette smoking as a possible cause of cancer. Thus environmental

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sanitation must now deal with the so-called degenerative diseases as it used to deal with the enteric and insect-borne diseases.

The grim story of deaths from respiratory diseases in smog-bound communities does not need to be retold. It is a striking example of the necessary interdependence of public health programs and industrial health programs. Help in solving this perplexing problem may be expected from the research on which the Public Health Service has already contracted to spend a half million dollars or more.

Our water resources are a problem of top priority. In many areas, water shortage already threatens to halt further industrial expansion. According to the U.S. Public Health Service "we need 6,600 more municipal sewage plants or additions, and 3,500 more industrial waste treatment plants or additions to take care of existing pollution. The total cost of a national municipal and industrial pollution abatement program would range rougnly from $9 billion to $12 billion depending on the water uses finally chosen." As a beginning, the new Federal Water Pollution Control Act authorizes up to $500 million for aid in constructing municipal sewage treatment works.

Building new plants and expanding old ones, however, is not enough. Old plants, as well as new ones, must be satisfactorily operated. According to the Public Health Service, nearly a quarter of the existing municipal treatment plants and one-fifth of the industrial plants are not satisfactorily operated.

So with this needed investment in treatment facilities, there is needed very substantial investment in training the manpower to operate both the old and the new facilities. Industry's stake in this problem is twofold. It needs clean water for its manufacturing processes. It needs clean water for the protection of the health of its employees and the promotion of their well-being.

Atomic Radiation

THIS PROBLEM of water pollution is now about to be enormously accentuated by the advent of the atomic age. Mark Hollis has said further, that "man's ability to control the impact of radioactive waste on the environment will be a significant factor in future metropolitan growth. Radioactive contamination does not follow our set patterns and established formulas of dispersion, dilution, and biochemical actions." This means that we cannot count on traditional methods of "sewage disposal" to handle these new wastes.

We are already exposed to atomic radiation from four sources. There is what is called "background" radiation which comes from radioactive substances in the earth and within living plants and animals. There are the cosmic rays which are constantly bombarding the earth. There are the various forms of man-made radiation of which x-rays are the most important, and finally there is fall-out from atomic explosion. These all add up, gradually increasing our lifetime exposure. But so far this cumulative exposure is without apparent danger. On top of this accumulation, we now foresee the enormous output of radioactive fission products which will result from nuclear power plants and the growing use of nuclear energy in medicine, agriculture, food processing, transport, and many other industrial processes using radioactive materials. There is a biological limit to the amount of radiation which human beings can absorb without danger to themselves and to the race. The biological effects of atomic radiation have been splendidly summarized in the recent reports from the National Academy of Sciences. Every person interested in industrial hygiene should read these reports and ponder on what their conclusions may mean for their work. It is worth quoting here the highlights from that report as summarized by the publication *Nucleonics* in its July, 1956, issue:

"Until advances in reactor technology substantially reduce potential hazards, buildings that house reactors located near populated areas should be sealed against the release of radioactive materials in the event of accident.

"Research should be accelerated, particularly on safety devices for control of accidental power surges in reactors, selection of biologically suitable sites for various nuclear facilities, geographical and geochemical aspects of ultimate deposit of radioactive wastes, mixing between various parts, of the oceans and the atmosphere.

"Records should be kept for each individual, showing his total accumulated lifetime exposure to radiation. Medical use of x-rays should be reduced as much as is consistent with medical necessity.

"Reactor-waste processing plants or storage facilities are held to offer a greater hazard on a long-term basis than any single reactor. Development of improved methods to limit the volume of wastes produced in power reactors and continuous appraisal of reactor and fuel processing plant design and operation as well as of waste storage will be required to help keep world environmental radioactivity levels at tolerable levels. The report calls for suitable waste disposal services."

You will note that three out of four of these recommendations relate to environmental health.

Policing the Route of Infection

WHILE PREPARING for these new hazards, however, we must not overlook certain other hazards that are already with us. Over a period of time we have reached the place where basic sanitation in industrial plants has become pretty good. Lavatories and locker rooms are generally held to high standards. Control of heat and

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humidity in work areas is taken for granted, at least in new construction. An abundant supply of safe drinking water is usually available to all workers, but it is to be noted that the pail and dipper have been replaced by the equally unsanitary bubbling drinking fountain. The studies of A. P. Hitchens and O. A. Ross at the University of Pennsylvania showed in 1943 that pathogenic organisms of respiratory origin are present on the nozzle and in the bowl of drinking fountains, even of the angle-jet type. More recently, Mallmann and Fontes at Michigan State College have confirmed the Hitchens and Ross findings as well as similar findings by earlier investigators. In addition, they demonstrated that all bubbling drinking fountains have an aerosol effect which results in the deposit of washings from the mouth on all nearby surfaces.

In view of these findings, it is startling to realize that the public drinking fountain is the only public purveyor of a drink which is not under the supervision of public health authorities.

Another channel of infection which must increasingly concern those charged with responsibility for industrial health has arisen with the growing custom of offering food to factory and office workers on the premises.

In a recent survey by the Paper Cup and Container Institute of 1,277 plant officials representing a varied cross-section of American industry, 55% reported that they are now serving food and 39% said that they had expanded in-plant food service or had installed new types of service in the past two years. That this trend is still continuing is shown by the fact that 18% of the respondents to this survey reported that they plan further expansion or the installation of new facilities within the next two years.

The size and type of these food installations vary enormously. Some plants serve food to over 3000 and others to less than 250. In some industries, food is served to workers at their stations near machines and in a few cases food is served leisurely by waiters in executive restaurants. Almost every conceivable variation between these two extremes exists and each poses its special problem in sanitation, especially where workers are fed in closely-timed shifts.

Another environmental hazard applicable to both home and industrial feeding has been graphically described to me by Jerome Trichter, Assistant Health Commissioner of the New York City Health Department. He says:

"A person purchasing a loaf of commercial bread today receives a product which, at one stage or another in its development, has been in contact with a succession of chemical compounds more or less hazardous. Chemical insecticides, fumigants and herbicides which are now being added to the soil contain lead, arsenic, benzene-hexachloride and other poisons. Wheat seeds are fumigated with methyl bromide or may be treated with fungicides before planting.

"The grain is grown with the help of these chemicals and stored in close contact with any of a large number of insect and rat killers. When the wheat is milled into flour it is bleached with one of a group of chlorine compounds. In the plant where the bread is baked, there are insecticides, rodenticides, detergents, air purifiers, lubricants, disinfectants and a long list of other chemicals which have to be kept out of the product. In addition to these 'foreign' substances, the bread itself may contain coloring agents, flavors, antioxidants, conditioners, anti-staling agents, solvents and other synthetics, and finally when this loaf of bread reaches the storage shelf, it often sets cheek by jowl with more chemicals. Today's society is built upon the use of chemicals and significant problems have arisen with their increasing use."

This situation not only concerns the companies who produce the food but those whose employees consume the food.

Industry and Plant Communities

IN THE PAST industry has usually not played an active role in community public health programs except where critical situations in which it was directly involved demanded attention. Now despite the fact that industry is becoming highly decentralized with home offices often in cities far removed from its plants, there is increasing realization that plants must be actively good citizens in their communities.

Even if this interest in good community relations had never reached the point it has today, plant managers have other compelling reasons for interest in community health.

As working weeks grow shorter and the employee spends a greater proportion of his time away from the plant, the home and community environment takes on new importance. With the rapid rise of so-called leisure time, for example, workers create for themselves off-the-job hazards that would make plant managements shudder if these hazards existed in the plant. The words "leisure time" project a picture of people sitting with their hands folded in their laps doing nothing, but this does not happen in energetic America.

For one thing, people are traveling much more, so that leisure time may be partially responsible for the increase in highway accidents. Much leisure time is spent in various "do-it-yourself" projects. Here, people working in a field for which they are not trained and with tools they do not know how to use, do not recognize the accident hazards, including the hazards due to fatigue. Thus leisure time may well be a substantial contributor to the increase in home accidents. The whole concept of leisure time is erroneous because our puritanical tradition, which holds that it is sinful to be idle, leads people into all

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kinds of extremes in using their free time. Indeed, with the shorter work week, many people take on two or three paid jobs, so that they are working under a strain that no one company would ever countenance.

Plainly, we are doing an incomplete job in the environmental health field if our employees' entire environment—in plant and out—is not considered as a single picture. Participation in community public health work by industry has passed beyond a mere gesture of good community relations to become a practical necessity in conserving the health of its own highly-paid labor forces.

Chief responsibility for community health lies, of course, with the local health department. But your company and your employees are major elements of your community. You can often be the deciding factor in whether you have a good health department or a poor one, or any at all. Philadelphia has met this need for better liaison between industry and the community by creating an Advisory Committee on Environmental Sanitation with members drawn from industry and the Health Department. This Committee plays an important role in the development of Philadelphia's public health program.

Usually, it has been the medical societies, the public health professionals, and the social workers who have been the principal proponents of full-time local health departments. But industry too should take leadership to achieve the goal of a full-time local health department for every community. In return, a well-functioning local health department will give industry a dollar-and-cents return in increased productivity, reduction of absenteeism, and will provide the more healthy environment which is attractive to labor. On the other hand, many health departments have not recognized their responsibility for occupational health, and most of those which have recognized this responsibility, are not well equipped to meet it.

To deal with this problem, there is the greatest need for more public health manpower. There is a severe shortage of sanitarians, sanitary engineers, public health administrators, and other public health specialists. Industry has done exciting things in the past few years in helping to encourage and train future scientists. Similar recruitment techniques and assistance in education for public health workers would pay dividends for industry as under-staffed health departments shoulder heavier and heavier responsibilities. Some of this aid needs to be given at the high school level.

On a national basis, industry has already manifested a growing interest in supporting progress in environmental sanitation. In addition to my own organization, the Public Health Committee of the Paper Cup and Container Institute, which began work in 1934, we have seen similar developments in many other industries. The soap industry, the oil industry, the National Restaurant Association, the National Automatic Merchandising Association, the Dairy Industry Supply Association, the bakers, and perhaps the butchers and candlestick makers, as well, are knee-deep in programs of environmental sanitation. The organization of the National Sanitation Foundation in 1945 represented the pooling of interests in sanitation on the part of a great many different industries.

Another example of the pooling of interests in environmental sanitation is the recent formation of the national voluntary organization known as Keep America Beautiful, Inc. With funds drawn from some 20 industries, and with the guidance of an Advisory Committee representing 30 professional civic and other voluntary organizations it has embarked on a national program of litter prevention through education and stimulation of law enforcement. In spite of the rapidly growing menace and ugliness of litter resulting from our modern economy of waste, there is no one public agency which has over-all responsibility for this problem. Every manufacturer, therefore, whose products contribute to litter should be quick to realize that here is an opportunity for American industry to shoulder a responsibility which otherwise must in time be taken over by government with perhaps restrictive legislation. This responsibility can be discharged by support of litter prevention programs at national, state and local levels.

Management Planning for the Future

INDUSTRY has today a larger stake than ever in public health. Employees are more precious. They are necessarily better educated, they get higher pay, work fewer hours, are harder to get, and more expensive to train. The capital investment per employee is higher. The plant is part of its community and big industry is part of the national community. In its own interest, industry must contribute to and should expect help from the public health agencies. In today's labor market, considerations for environmental health are going to have a more important bearing on major company policies. Many people in all companies now have some health responsibilities: Doctors, nurses, safety engineers, production engineers, machine designers, personnel executives, maintenance workers, cooks and cafeteria managers, and others that you can name in your own organization. As in-plant health programs expand and grow more complex, the efforts of all these people will become more effective if their responsibilities for environmental health are coordinated in a single office. Such coordination will also make it easier to work with community and government agencies. To achieve this coordination, initiative, and leadership, there perhaps

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should be created the office of Vice-President in Charge of Health. Such a Vice-President should have management stature equivalent to the Vice-President in Charge of Sales or Vice-President in Charge of Production, because there can be no production or sales without healthy workers who can produce and sell.

A Vice-President in Charge of Health would, in effect, be the company's Health Commissioner. To serve most effectively, he would need special training in public health administration, as well as in business administration. His staff, not unlike that of a modern health department, should include trained sanitarians, sanitary engineers, health educators, vital statisticians, nurses, epidemiologists and other public health specialists.

He also should have a public health laboratory at his disposal. His authority, responsibility and scope of action would be somewhat more than that of the usual plant doctor, industrial physician or Medical Director. Although the usual industrial medical services might be under his direction, his prime responsibility would be to plan and administer a positive public health program which was designed to achieve for industry's employees that complete state of health defined in the World Health Organization's charter. Vice-Presidents in Charge of Health, the Health Officers of Industry, will be needed in building the New America.

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Health Habits and Heart Disease

A COMPARISON of health habits has been made between a test group of 100 patients with manifest coronary disease and a contratest group of 200 people with the same distribution of ages and occupations but without coronary disease. The importance of dietary habits is illustrated by the finding that only 27% of the test patients had average diets with a variety of food and an apparent balance between caloric intake and energy output, while 60% of the contratest group had a satisfactory nutritional status. The exercise patterns differed significantly also, with 70% of the test group showing no regular exercise patterns either at work or away from it, as compared with 30% of the contratest group. No influence of tobacco or of alcohol was evident in this study, but, among the patients who survived a coronary attack, 71% have been using alcohol in moderation anywhere from one to 10 years since the attack, and in this group all claim beneficial effects with less anxiety. Stress patterns were found to be important, but occupational titles were not reliable as indicators of occupational stress. Preventive measures should be taken if the heart rate and diastolic pressure show a sustained rise, regardless of electrocardiographic findings, and such measures become urgent if there is hypercholesteremia, xanthomatosis, or diabetes. There is evidence that the real culprits in coronary disease are not hard work, overexercise or occupational stress, but sedentary living and poor health habits.

—Abstract of "Health Habits and Heart Disease" by EDWARD P. LUONGO, M.D., Los Angeles, in *J.A.M.A.*, November 10, 1956.

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Occupational Medicine in France

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MEDICAL examinations were carried out systematically for the first time in France during the 1914-18 war, when doctors were given the task of supervising the health of workers in the armament factories. It was not until June 1, 1940, that the first law relating to industrial health appeared. This was an Act recommending that factory owners institute medical examinations of employees at the moment they were engaged, and periodic medical examinations of all their employees. It was no more than a recommendation, and no penalties for non-observance were provided for by the law. In 1940, France was invaded, and the recommendation was not acted upon to any great extent.

The first legislation regarding the institution of industrial health and social services was passed in 1942, laying down that any enterprise employing more than 500 workers was under the obligation of setting up an industrial health service. In 1943, this law applied to only three branches of industry: leather, pottery, and engineering. A few medical services were started in other branches, but they were rare. At this time France was occupied by the enemy and a compulsory labor service was in force; Frenchmen were forced to go to Germany to work in factories and the industrial health services were somewhat unsuccessful, as the necessity of registering employees' names made them suspect.

It was the Act of October 11, 1946, that put industrial health in France on its present footing. The field covered by this Act is much wider than that of the Act of 1942. Industrial and commercial concerns of all kinds, without regard to the number of persons employed, are required to set up industrial health services.

Industrial physicians must be specialists as far as possible, i.e., they should hold the Diploma of Industrial Medicine and be employed on a full-time basis. The work of these doctors is entirely preventive and consists of supervising working conditions from the point of view of health, and the health of the employees. Such doctors are not civil servants, but are paid by the factories. They are appointed by the factory managers after consultation with the "Comite d'Entreprise," composed of working members of the firm. Such medical services work independently; i.e., they are peculiar to one or several factories, depending on the size of the latter. Their cost is borne by the employers and depends on the number of employees in the concern.

The Act specifies the amount of time the industrial physician must devote to his work in different sorts of concerns: one hour a month for every 25 employees in commercial undertakings, public or state offices, professions, or in an establishment of any kind which employs labor; one hour a month for every 15 employees in industrial undertakings; one hour a month for every 10 employees in factories where work which may be considered unhealthy is carried out. The list of such industries is established by law and contains, for example, such work as the preparation, use, or handling of bromium, chlorine, sulfur disulfide, lead, mercury, etc., and spray-painting, work connected with compressed air, or which entails exposing workers to silicosis dust, etc.

The physician's hours of work are calculated on the basis of a quarter of an hour's medical examination of every employee, leaving half the doctor's working time free for visiting and inspecting factories and workshops and studying capacities required for different types of work.

If the number of hours of work thus calculated reaches a total of 173 per month, the factory or business concerned must establish its own independent medical service under the direction of a full-time doctor. All the material costs of such a service, plus the salary of the doctor, are borne by the factory or business.

Small businesses set up medical services shared between a number of them, and the cost of such shared services is borne by contributions from each business, based on the number of hours the physician must devote to each.

Each year a report on the organization and operation of each medical service must be sent to the Chief Factory Inspector and the Chief Industrial Physician.

The Act of 1946 sets forth the duties of industrial physicians as follows:

Medical Examination at Engagement

EVERY employee is examined on engagement, and this must include an x-ray examination of the lungs. At the time of this examination the in-

dustrial physician must state whether the employee is capable, from the medical point of view, of the work proposed for him; what work is most suitable or unsuitable for him; and whether he is likely to be contagious for his fellow workers.

The "assistante sociale" is in touch with the doctor, and directs persons whom the doctor does not accept to the Labor Exchanges, or the hospital, or to a doctor who will undertake treatment.

A medical history sheet is employed, of the same type for all concerns and for the Social Security Services. The history sheets are the property of the physician who compiles them, and may be communicated only to the Chief Industrial Physician; a copy is given to the employee concerned, and a form containing information as to the aptitude of the person, without medical detail, is given to the employer.

Periodic Medical Examinations

ALL EMPLOYEES are compulsorily examined once a year; those under 18 years of age, every three months; those who are disabled, pregnant women, and mothers of children less than two years old, may be examined more often. The doctor is the judge of the frequency of such examinations.

This is independent of the special regulations governing industries which involve particular risks and which necessitate more frequent examinations. In the lead industry, for example, a medical examination must take place not only on appointment, but also three months later and, thereafter, at six-month intervals, the examination including blood picture and other special tests. The same is true of industries that handle benzol, mercury, etc.

Medical Examination After Illness

WHEN an employee has been absent from work for more than three weeks for medical reasons, or if he is often absent, a medical examination is compulsory in order to ascertain whether he has a contagious disease, whether he is still fit for his work, or whether it is necessary to put him on other work. Medical investigation of absence from work is carried out by doctors associated with the Social Security Service.

The time taken by medical examinations counts as working time and is paid for as such.

The industrial physician acts as a practitioner only in urgent cases; he supervises treatment given by nurses, and directs those in his charge who became sick to practicing doctors with whom he is in touch.

The industrial physician is also responsible for the supervision of hygiene in factories and places of work. He is a member of the Hygiene and Safety Committee, an organization which is compulsory in all commercial concerns of 500 or more employees, and in all industrial concerns of 50 or more employees. He advises the factory or business on questions of heating, lighting, cloak rooms, washrooms, protection of workers against dust, noxious gases, vapors, etc. It is his duty to have constantly before him the question of the suitability of individual employees for the work they do, and to seek continually to better the conditions of work. The industrial physician is bound to secrecy in the matter of secret manufacturing processes.

The factory owner or manager must take the advice of the industrial physician, and, should differences of opinion arise, these must be brought before the Chief Factory Inspector and the Chief Industrial Physician.

The industrial physician must make known, for purposes of statistical record, the industrial diseases which are brought to his attention.

Nursing services are obligatory, and the law requires the presence of a nurse for commercial concerns having 500 or more employees, and for industrial concerns with more than 200. Two nurses are required if the number of employees is 1,500 in commerce, or 800 in industry. Nursing services must be available during all work hours, and at night, if necessary. Furthermore, in workshops where dangerous work is undertaken, employees must be taught the elements of first aid.

The Act leaves nothing to chance, and even states the number and size of the rooms to be provided for factory medical services: under 500 employees, two rooms of at least 16 square meters floor space; 500-1,000, three rooms of at least 16 square meters floor space; and 1000 and over, three rooms of the same size; a waiting room, medical inspection room, surgery, three dressing rooms (which must total at least four square meters floor space), and finally a rest room of eight square meters floor space.

The above requirements are, of course, minimum ones. The rooms provided for the medical services must be well-lighted, heated, and soundproofed, and must have running water.

When a new factory service is instituted, a request for its acceptance must be sent to the Chief Factory Inspector and the Chief Industrial Physician, accompanied by an inventory of medical equipment provided.

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Industrial Hygiene Foundation

Twenty-First Annual Meeting, November 14-15, 1956

THE INDUSTRIAL HYGIENE FOUNDATION held its Twenty-first Annual Meeting at Mellon Institute, Pittsburgh, November 14 and 15, 1956. A capacity audience of industrial physicians, industrial hygienists, public health workers, safety engineers, and others in the industrial hygiene field attended the presentations in the Mellon Institute Auditorium and Hotel Webster Hall.

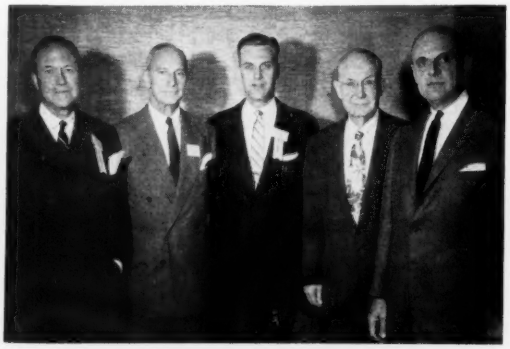
The proceedings for the first day were divided according to areas of interest into Medical, Legal, Chemical-Toxicological, Engineering, and Management Conferences. These were held concurrently.

Medical Conference

IN THE Medical Conference, three papers were heard: "Effective Educational Techniques in Industrial Health Counseling"—Raymond J. Murray, M.D., Sperry Gyroscope Company; "Legal Aspects of Industrial Medical Practice"—William A. Challener, Jr., Challener and Challener, Pittsburgh (see page 96); and "An Evaluation of Pulmonary Emphysema"—George W. Wright, M.D., St. Luke's Hospital, Cleveland.

Legal Conference

IN THE Legal Conference, there were five papers: "Legislative Review: Development in Workmen's Compensation"—Andrew Kalmykow, Association of Casualty and Surety Companies; "Air Pollution Legislation in New Jersey"—Leonard C. Johnson, New Jersey Manufacturer's Association; "Health Considerations in a World of Expanding Atomic Power: Medical Aspects"—Thomas L. Shipman, M.D., Los Alamos Scientific Laboratory; "Legal and Insurance Aspects"—Ashley St. Clair, Liberty Mutual Insurance Company; "Reactor Safeguards"—Dr. C. Rogers McCullough, Atomic Energy Commission.



At the Management Session—left to right: Andrew Fletcher, President, St. Joseph Lead Company and Board Chairman of the Foundation; George A. Benington, President, Mutual Chemical Division, Allied Chemical & Dye Corporation; C. Richard Walmer, M.D., Managing Director of the Foundation; Dr. W. A. Hamor, Senior Director of Research, Mellon Institute, and Chairman of the Foundation's Research Advisory Council; and General Matthew B. Ridgeway, Chairman, Board of Trustees, Mellon Institute.

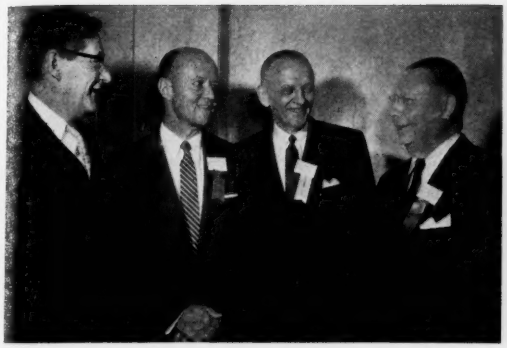
DR. SHIPMAN said, in part, "There is a very real probability that the medical and biological and genetic factors may determine the pace at which our program of Atomic Power for all may proceed. . . . The consummation of a power reactor within the next century is not only a necessity, but almost an emergency. . . . It now appears probable that our existing fossil fuels such as petroleum and coal will be virtually depleted within a matter of decades, while the power requirements of the world a hundred years from now will in all probability have increased 50-fold. Atomic power resulting from fission appears to be the only stopgap that will take care of our needs through the lifetimes of our grandchildren and great-grandchildren while we are awaiting the developments of power through thermoneuclear reactions from what now appear to be almost inexhaustible sources of fuel. . . . Can we increase the existing number of power reactors and still be safe?"

Chemical-Toxicological Conference

THE CHEMICAL-TOXICOLOGICAL Conference included: "The Relative Roles of Carcinogenic and Non-carcinogenic Irritants in Problems of Occupational Cancer"—A. Wesley Horton, M.D., University of Cincinnati; "Pneumoconiosis in the Diatomite Industry"—Dr. W. Clark Cooper, Public Health Service; "Gas Chromatography"—C. B. Willingham, Mellon Institute.

Engineering Conference

THE ENGINEERING CONFERENCE included: "Public Health Service Engineering Program on Air Pollution Control"—Arthur C. Stern, Public Health Service; "Research and Development for Cleaning of High Temperature Gases"—Dr. Leslie Silverman, Harvard University School of Public Health; "Spread of Particulate Contamination from Stacks"—



Participants in a panel discussion at the Joint Technical Conference—left to right: Dr. Paul W. Bachman, Vice-President and Director of Research and Development, Koppers Company, Inc.; Lemuel C. McGee, M.D., Medical Director, Hercules Powder Company; V. P. Ahearn, Executive Secretary, National Industrial Sand Association; and C. R. Oviatt, Legal Department, Union Carbide and Carbon Corporation.

Speakers at the Legal Conference—left to right: Dr. C. Rogers McCullough, Division of Civil Application, U.S. Atomic Energy Commission; Dr. Joseph A. Lieberman, Division of Reactor Development, U.S. Atomic Energy Commission; Dr. Thomas L. Shipman, Health Division Leader, Los Alamos Scientific Laboratory; and Ashley St. Clair, Counsel, Liberty Mutual Insurance Company.

William B. Harris, Atomic Energy Commission; and "Practical Industrial Air Cleaning Problems"—John M. Kane, American Air Filter, and Robert T. Pring, Wheelabrator Corporation.

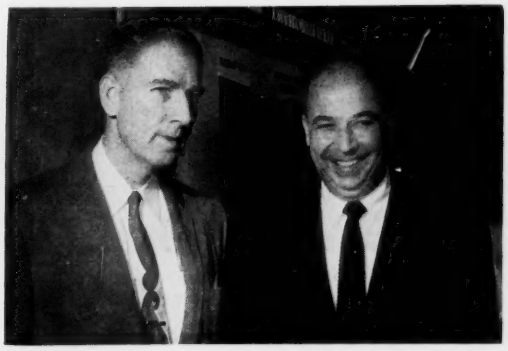
The afternoon of the first day, November 14, was devoted to a panel discussion, "Health Problems Involved in the Manufacture, Sale, and Use of Toxic Materials"—Moderator: V. P. Ahearn, National Industrial Sand Association; Panel Participants: Dr. P. W. Bachman, Koppers Company, Inc.; H. S. Baile, General Accident, Fire and Life Assurance Corporation; T. F. Hatch, University of Pittsburgh; L. C. McGee, M.D., Hercules Powder Company; C. R. Oviatt, Union Carbide and Carbon Corporation; and Dr. John A. Zapp, Jr., E. I. du Pont de Nemours and Company.

Management Conference

TALKS presented on the second day, November 15, included: "Address of Welcome"—General M. B. Ridgeway, Mellon Institute; "Foundation Facts"—C. Richard Walmer, M.D., Industrial Hygiene Foundation; "Reports on Technical Conferences of November 14"—Conference Chairmen; "Foresight in Industrial Health"—Andrew Fletcher, St. Joseph Lead Company; "Hygiene—Industry's Opportunity and Challenge"—George A. Bennington, Allied Chemical and Dye Corporation; "Applications of Communications to Industrial Health"—Mathew J. Beecher, American Management Association; "The Importance of Air Pollution Control Regulations in Industry"—Alexander MacDonald, Los Angeles; "Looking Forward in Medical Education as It Relates to Industry"—Joseph C. Hinsey, M.D., Cornell Medical Center; "Epidemiology in Industrial Health"—Dr. Paul M. Densen, Health Insurance Plan of Greater New York; "Automation's Effect on Environment"—Merald Lue, Reinhold Publishing Company (see page 98); and "Operations Research: Problems in Health"—John D. Dillon, Rano-Woolridge Corporation.

DR. HINSEY said, in part, "In November, 1955, the Association of Teachers of Preventive Medicine, which is composed of the faculty mem-

At the Medical Conference—William Challener, Jr., Pittsburgh Attorney-at-law, left, and Daniel C. Braun, M.D., Medical Director, Industrial Hygiene Foundation.



Speakers at the Management Conference—John D. Dillon, Rano-Woolridge Corporation; and Merald Lue, Vice-President, Reinhold Publishing Corporation.

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At the Management Conference—left to right: Paul M. Densen, M.D., Director, Division of Research and Statistics, Health Insurance Plan of Greater New York; Joseph C. Hinsey, M.D., Director, New York Hospital, Cornell Medical Center; and Dr. Robert A. Moore, Vice Chancellor, Schools of the Health Professions, University of Pittsburgh.

Comparing notes on Technical Conferences—left to right: G. P. Eddy, M.D., Medical Director, The Carborundum Company; O. A. Sander, M.D., Associate Professor, Marquette University; George Wright, M.D., Head, Medical Research Department, St. Luke's Hospital (Cleveland); and Dr. Paul Gross, Research Pathologist, Industrial Hygiene Foundation.

bers from our medical colleges, had a meeting in Kansas City on the subject of occupational medicine.

"This demonstrated an increased interest on the part of these faculty members in their responsibility to improve their offerings in this area. They had round-table discussions on such subjects as absenteeism and productivity, employability and employment, rehabilitation, medical care, the prevention of disease, disability evaluation, and disease prevention. On December 6, 7, and 8, 1955, the Association of American Medical Colleges, two Councils of the American Medical Association, and the National Fund for Medical Education sponsored a conference on the Education of Physicians for Industry. In the final paragraph in the report of the panel dealing with training of physicians at the undergraduate level, this statement is made: 'It is obvious that occupational medicine, itself, is co-extensive with all of medical practice and on this account lends itself to rather easy incorporation in the existing framework of the medical curriculum. In the design of curricular adaptations toward this purpose, the body of knowledge that students must learn and the associated attitudes they need to develop stand to gain in generous measure by adding the dimensions available from those who are students of occupation and health.'

"In reviewing some of the major developments with relationship to their trends and significance to general public health in our modern society at this Conference, Dr. Norvin C. Kiefer listed the following: pre-employment medical examinations, provision of emergency medical care, assurance of healthful general working conditions, control of specific industrial hazards, and provision of periodic health examinations and health counseling.

"Dr. Leo Wade listed the outstanding problems of industrial medicine as follows: '(1) properly

At the Engineering Conference—left to right: William B. Harris, Chief, Industrial Hygiene Branch, Health and Safety Laboratory, U.S. Atomic Energy Commission; Robert T. Pring, Technical Director, Dust and Fume Control Division, Wheelabrator Corporation; and John M. Kane, Technical Director, Dust and Fume Control Division, Wheelabrator Corporation.

Between sessions—left to right: Douglas Soutar, Division of Industrial Relations, American Smelting & Refining Company; Leo Teplow, Industrial Relations Consultant, American Iron and Steel Institute; John R. Corbett, American Smelting & Refining Company; and Robert B. O'Connor, M.D., Medical Director, United States Steel Corporation.

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At the Chemical-Toxicological Conference—left to right: Kenneth W. Smith, M.D., Medical Director, Johns-Manville Corporation; H. H. Schrenk, M.D., Research Director, Industrial Hygiene Foundation; and Andrew D. Hosey, U. S. Public Health Service.

At the exhibit of the American Medical Association's Council on Industrial Health—B. Dixon Holland, M.D., Secretary of the Council on Industrial Health, left, and Daniel C. Braun, M.D., Medical Director, Industrial Hygiene Foundation.

trained and qualified physicians for initiating and maintaining preventive and constructive medical programs in industry are few; (2) confusion exists among medical educators and physicians in industry regarding both the objectives and the methods for providing the needed personnel; (3) undue emphasis upon the treatment of acute or life-threatening disease by most physicians has led many workers to expect that any good medical program in industry should provide free treatment of disease; these workers have little interest in and appreciation for other types of medical services; (4) management, too, is often unclear as to what it expects of the Medical Departments, and, by and large, has not yet learned to use the physician optimally' . . . .

"Industry has a real stake in what the medical schools in this country do to meet the future health needs of our nation. There will be a need for more and better prepared physicians for industry's departments of occupational health. For example, Dr. William C. Menninger has stated that, 'there are only four full-time psychiatrists and one half-time psychiatrist in all industry. Perhaps 200 more have a nominal relationship with business, most of them treating employees who become disturbed and are referred by the company.' It is most significant that something like 70% of the working population are in small plants where they are cared for, not by physicians in well-organized divisions of occupational health but by physicians in private practice. You must be concerned that our educational standards be maintained and improved. . . .

"Industry shares with the American public the desire to maintain and obtain the best possible health care based upon a philosophy of positive health and of sound and up-to-date therapy available to all our citizens. The fact that more than 103 million people have insurance to cover some part of hospitalization and medical care shows how real this interest is. You will be expanding your departments of occupational health, and smaller industrial concerns desire a practicing profession that is highly qualified. Our labor unions have demonstrated increasing interest in better health care for their members and they have the financial means to obtain it. People in rural communities are not satisfied with the care that is available. Demand is becoming greater, and we hope some day will catch up with need. One important answer to meeting the needs of our people is to have more able and qualified medical graduates with educational backgrounds of a high order."

MR. DILLON said, in part, "An intriguing application of punch card techniques may be made in industries and laboratories particularly those involved with the handling of materials or use of processes of a toxic or dangerous nature. Master cards can be designed to include signs and symptoms of toxicity of each material to which there is possible exposure in a given plant. When a patient reports into the dispensary, his signs and symptoms can be coded promptly onto his card and his card then matched against the deck of master cards. On each master card could be recorded the proper diagnosis, proper first aid treatment, if indicated, and further action required, e.g., hospitalization. For a small plant or laboratory, the deck of cards would be small enough for manual handling; for large organizations, machine processing of the cards is indicated. In the small organization, a simple card index, for manual use only, might be designed for the industrial Medical Department which would give signs, symptoms and correct first aid treatment for each toxic material that is handled by the workers.

"Another application has been considered by others but has not yet been completely accomplished, namely, the matching of worker 'physical capabilities' with a job's 'physical demands.' "

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Legal Aspects of Industrial Medical Practice

WILLIAM A. CHALLENER, JR., and FRANCIS C. McQUILKIN
Attorneys-at-Law, Pittsburgh

THERE APPEARS to be an increasing tendency in some companies to extend the medical care of their employees to non-occupational conditions. Such services as vaccinations, inoculations, diathermy treatments, and injections are offered without any relationship to occupation. Very often the industrial nurse renders these treatments. This paper considers some of the problems and dangers inherent in extending services to non-occupational conditions.

A doctor's liability becomes established once he has accepted an employee as a patient, regardless of whether this is gratuitously at the request of the employee, or at the request and expense of the employer. Further, the employer may also be liable.

The Workmen's Compensation Act of Pennsylvania does not bar an action by an employee for alleged malpractice. Eight cases are cited in which juries returned malpractice verdicts ranging from $60,000 to $290,000.

The relationship of master and servant is discussed as it applies to physicians and nurses in industrial medical practice. While ordinarily, a physician and a registered nurse, by reason of their professions, are independent contractors, they may also be employees, and under certain conditions they become agents of their employer.

Medical Attention in Pre-employment Examinations

THE SUBJECT of medical attention and pre-employment examinations is considered. A case is cited in which the plaintiff, a former employee, was awarded damages from the employer because of injury resulting from the physician's negligence in attempting to draw blood for a pre-employment examination.

The decision was that the doctor, a regular employee on the payroll of the organization, was not acting as an independent contractor, but was "required by the employer to make a 'blood test'," and that the employer was liable for his negligence.

From a presentation at the Twenty-First Annual Meeting of Industrial Hygiene Foundation, Mellon Institute, Pittsburgh, Pennsylvania, November 14-15, 1956.

Medical Attention Rendered for Gain or Profit

IN THIS connection, a number of cases are cited in which the decisions held that a doctor, following a pre-employment examination of an applicant, in advising and later performing an operation for double hernia, was acting in the interests of the employer. Similarily, it was held that a doctor in taking an x-ray of an injured employee's back, at the request of the plant manager, was primarily acting in the employer's interest.

Medical Attention in Non-occupational Cases

INJURIES sustained by an employee during the course of treatment for non-occupational conditions do not come within the provision of the Pennsylvania Workmen's Compensation Act; hence, the latter is not a bar to common law action against an employer for injuries so sustained.

It seems to be the general rule that an employer who undertakes gratuitously to furnish medical attention to his employee is liable only if he is negligent in the selection of the physician. But where the medical services are furnished, pursuant to a contract or under circumstances that a direct benefit to the employer results, or where misrepresentation is involved, the employer may be liable for the negligence of the doctors so employed. Reference was made earlier to the fact that the industrial nurse was often called upon to give vaccinations, inoculations, injections or other treatment when the employee presents himself at the dispensary. Does such treatment by a nurse constitute the practice of medicine? This question can only be answered by an examination of the statutory and decisional law in the particular state in which the treatment is rendered.

The Pennsylvania Medical Practice Act is quoted as well as provisions of the Professional Nursing Law. There are no decisions construing or interpreting this act, but the opinion of the Attorney General of Michigan on a similar statute was to the effect that a registered nurse could not remove a foreign body from the eye or hand of an employee if the procedure involved an act of surgery, the manipulation being surgical. If the foreign body has penetrated the tissue,

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even to the slightest degree, the nurse could then remove it only under the immediate and direct supervision of a doctor. Likewise, the prescribing or administering of cold tablets or other medicine in any form must be under the immediate and direct supervision of a physician.

A doctor may give a nurse an order for almost anything, but it should be obvious that she must not carry out an order unless in so doing she remains within the bounds prescribed for her by law. A doctor by his orders cannot enlarge or vary the terms of the Medical Practice Law.

A nurse cannot judge the nature, characteristics and symptoms of a disease, determine the proper remedy for the disease or give or prescribe the application of the remedy to the disease. Standing orders which would require or permit a nurse to do any of these things would constitute the practice of medicine. There are many things that a nurse may lawfully do in the field of medicine or surgery which she could not do on her own initiative or independent of a physician's orders or instructions. Unless the nurse were permitted to do these things, her usefulness would be largely curtailed, if not wholly destroyed. The nurse may not assume the place of the physician and practice medicine and surgery, but she assists him in the practice. The direction and supervision of the physician must be actual and not theoretical. The physician must have first examined the patient, made his diagnosis, and prescribed the treatment and services.

While under certain circumstances, the employer may not be liable for the torts of the industrial nurses, this fact does not relieve the nurse or the Medical Director from their own liability. It is an unbending rule that every person is responsible for his own acts or conduct. The great weight of authority established the principle that nurses, in the discharge of their duties, must obey and diligently execute the orders of the physician or surgeon in charge of the patient, unless, of course, such order is so obviously negligent as to lead any reasonable person to anticipate that substantial injury would result to the patient from the execution of such order or performance of such direction.

Medical Attention Required by Statute

IN PENNSYLVANIA there are a number of statutory requirements affecting industry in relation to the practice of industrial medicine. For example, an employer must cause every employee exposed to lead fumes, dusts or solutions to be examined at least once a month.[1] If, in the prosecution of the work, persons are employed in compressed air, an employer is required to employ a physician to be present to render medical assistance at all necessary times.[2]

A failure to comply with the requirements of a statute imposing a duty to have a physician present to render medical assistance or to maintain an ambulance at a mine, may result in liability of the employer if the failure is the proximate cause of the injury or death.[3]

Medical Attention as Evidenced by Records

FINALLY, we should remember that every accident is a potential law suit or compensation claim. In the prosecution or defense of such claims, accuracy of records is as essential as accuracy of diagnosis. Full and complete records made at the time of the injury or at the time of the contraction of the disease, may be a controlling factor in the disposition of the lawsuit or claim. Accordingly, the patient's complaints and the findings on examination should be recorded with sufficient detail so that they support the diagnosis and are sufficiently detailed to serve to refresh the recollection of the physician if it becomes necessary to refer to them later on, either for testimony or for future treatment. The history should include not only the fact that an injury has occurred, but also the mechanics of the injury, the nature of the force, the direction from which it was transmitted, and the position of the patient at the time of the stress, strain or injury. Such records serve not only as a protection to the physician who makes them, but also serve to protect the interest of both the employer and employee.

References

1. Act of July, 1913, P.L. 1363, 43 P.S. 477.
2. Act of July 19, 1917, P.L. 1088, 43 P.S. 446.
3. Davis v. Pennsylvania Coal Co., 209 Pa. 153.

Day In, Day Out

YOU THINK you've been around a long time? You think you have a steady job? Well, can you top this! At Corning Glass Works, Frank Hultzman has been on the payroll for 80 years! This is believed to be the longest record of continuous service in American industry. The remarkable part of this record, beginning in 1876 when Hultzman was 12 years old, is that he has never missed a day of work in the entire 80 years. He has a son, "Dutch," who has been on Corning's payroll 56 years and, at 70, is showing signs of settling down and staying put.

—From A. J. Griner Company Newsletter, Kansas City, Missouri, December, 1956.

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Automation's Effect on Environment

MERALD LUE, Vice-President
Reinhold Publishing Corporation
New York City

AUTOMATION is a busy and presumptuous word. Much of all it promises will be realized and when that happens, we could be closer to limited perpetual motion. If there should be no such thing as wear, problems would be fewer; but machines, parts and systems do wear out and total self-repair, necessary to automation, is remote. I am not aware of the existence of any total feedback, fully automated plant which goes untended by man. There are some semi-automated operations but the human element is still necessary. The closer we get to automation, the more direct labor workers will give way to maintenance men and plant engineers.

Realization of extensive automation is foreseeable but not at hand. Today we are concerned with the automatic controls that make the machine tools do the work after they are programmed by men, who are aided by tape recorders, computers and punch cards — machines which are under surveillance of men and women who read data, dials, needles or graphs that keep the operation going on schedule. We are seeking application of appropriate controls to chemical processes, steel making, auto-making, electronic assemblies, metal working and food processing. Even then, we do not have automated industries and plants; we have automatically controlled plant operations or units within plants.

Industrial hygiene has dealt to a great extent with prevention and treatment of hurts to the physical being. As automatic controls progress, there is and there will be constant change in the character of physical problems, and attention to the mental well-being will have multiple growth.

It may be for members of the industrial health profession to sell management on the acceptance of school-type "recesses" for plant and office because workers who tend automatic machines must have relief from monotony. Such "recesses" may be training periods for better, more responsible jobs or higher qualifications imposed by new developments in controls. In the interest of a safer, better environment for the worker, industrial health specialists are as important on the design team for a revolutionary new labor or time-saving operation as are the production, research, management and market development men. And the voice of the industrial hygienist is one of the most important in selling management on related, preventive moves to by-pass illnesses and injuries.

As man moves from drudgery and danger, he depends less on a strong back, muscles and bones. These components of the body need less attention. His intelligence level should be higher. His response to routine is rebellion to monotony, or passivity to the point of ineffectuality.

His alertness will no longer be so necessary in safeguarding a finger, a hand, foot or eye. His mind will be in tune with the controls which can improve, or ruin, production. Total factory outputs depend on his attention being on the controls at the exact moment when something is signaled to be wrong. Correction then means tens of thousands of dollars to operations. Management under your counsel keeps him alert and sees the cost as a small investment, compared with ineffectual operation. The preplacement examination will be increasingly important as industry becomes more influenced by automation and automatic controls.

Our economists and forecasters seem to feel that industrial expansion will continue for a few years. Capacities are expected to grow from 1956 to 1959 an average of 18%. These are for metals, machinery, transportation equipment, metal-working, chemicals, paper, rubber, glass and ceramics, petroleum refining, food and beverages. All are industries with their eyes and plans on more automatic controls and practical automation. To keep production rolling, sales are supposed to increase 7% with much of the total accounted for by new products.

WE CANNOT concern ourselves here with the economics or unemployment problems some say an automated world might face. Perhaps our interest in those subjects can be dealt with quickly in a belief that the automation we have today and we probably will continue to know for a long time to come is not cutting back on our labor force. We are at an all-time high, with 66 million workers and 2,200,000 unemployed. Even with progress in automation, Philip T. Sprague, Jr., Executive

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Vice-President of Hays Corporation, Michigan City, Indiana, predicted in a speech before an Instrument Society of America meeting in Kalamazoo, Michigan, that there will be a shortage of between nine and 21 million workers in 1975 and our population may reach 220 million by that time. There are estimates that 1975 will see 95,400,000 in our labor force, 18,000,000 production workers and 8,200,000 professional or semi-professional workers.

Industrial hygiene and industrial environments will continue to be even more important year after year but the balance of consideration does change, as in the case of the white collar worker and the plant worker. Many factory hazards which were critical problems a few years ago no longer exist. On the other hand, health problems of white collar or clerical workers must of necessity increase.

In 1940 there were 4,500,000 men and women in clerical work (10.8% for each 100 employed). Today there are 8,000,000 (15.4% for each 100 employed). This increase is 33% more than the increase in factory workers. Labor-saving automatic office equipment has not put clerks out of work. Instead, the clerical working force grows.

Environment problems here take different shape. Where vast numbers of eye problems in the past were traumatic, now the overbalance toward clerical personnel means vision protections, sight saving, corrections, treatments, testing and prescriptions. Close work and concentration on data-handling machines for office workers and control dials, lights and panels for plant workers require changing emphasis in eye attentions alone. Further, the health problems of sedentary workers increase with the growth of office forces and the diminishing need for physical efforts by plant workers who tend automatic machines.

The problem which probably demands the most from industry at this time is a need for up-grading knowledge, training and skills. This involves some of the men who will concern themselves with, for example, the higher techniques employed in the manufacture or operation of such complicated products as a recently announced air-borne digital computer. This three-cubic-foot brain can solve mathematical problems in one second that would take a math whiz with pencil and paper nine hours, or require a clothes closet full of ordinary computer equipment. The more we get into automatic controls and automation, the more we come into contact with the mental and physical problems of the men who control these improvements.

In the flying business, automatic controls keep flyers alive, planes flying, allow instrument landings, allow split-second controls too fast for man, and are being developed to safeguard against mid-air collisions. The planning here offers new work opportunities and new plant and office health problems. Adjusting controls to the pilot, determining his capacity to use how many, or an important few, keeping the necessary instruments and designing them around him are a part of a relatively new profession known as human engineering. Environments in airplane cockpits, modern plants and data-controlled offices are being studied to relieve the stresses and strains men and women undergo in our faster-paced era of automatic controls. Here again is evidence of the re-direction of industrial hygiene toward preventing physical and mental health problems. One of the important steps is for management to see the economies and increased productivity resulting from scientifically designed environments. Some of these appear to be revolutionary on the surface, but underneath, they can be the building blocks to more efficient operations.

Soon to be started is the midtown Manhattan study for white collar workers which can benefit 20 million United States people in this category. The study, to start next January when the new 42nd Street Beth David Hospital opens, came out of a September business and industrial medical conference in New York of 250 corporation executives and medical scientists. The conference was devoted to improving the health and mental resilience of workers—among them young executives between 25 and 45.

"This fellow in the middle," according to Dr. Leonard Cammer of the New York Medical College and Flower-Fifth Avenue Hospital, "is more to be pitied than envied. His power is curbed, his control restricted, his right to make decisions is denied. The potential consequences are mental strains and bad health."

The program accent, he said, will be on preventive medicine — starting the white collar worker out healthy by pre-employment tests and keeping him that way.

IN STILL another area we must be interested in the remote controls that protect workers and users of pharmaceutical or medicinal products. These products must be produced in a germ-free atmosphere and environment. To keep them untouched by human hands from start to final closure of packages requires automatically-controlled operations and these, in turn, supply mass production. The controls that make large volume production possible are essential to solve medical supply problems across our vast and growing industrial empire. A new medication for prevention or treatment goes into volume production, and toxicity and dermatitis problems face better solutions. The following example is significant because automatic-type production, for instance, speeds the volume manufacture of a product ingredient for use in the tool and die industries, where delays, in turn, hold up automatically-con-

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trolled production lines in the auto and fabricating industries. It is that workers using epoxy tooling compounds are closer to doing their jobs with no fear of severe skin irritation or allergic reaction to polyamine hardeners. The solution to the problem has been plaguing tool and die producers and electrical equipment manufacturers. It is based on the introduction of an hydroxyalkyl group into the amine cross-linking agent structure.

Automatic controls may not have direct effects on workers; but they make new products, new processes, new production volumes possible. This makes larger work forces necessary for you to keep in health. These new processes require more thorough application of automatic controls. Many new processes and operations would be impossible without automatic controls. The new families of synthetic fibers, antibiotics and atomic industry products need automatic controls for volume production plus worker safety. Even though the first extrusion of nylon was through a hypodermic needle, $27,000,000 were necessary to surround its production with old and new controls and 13,000 new jobs for men and women in development, production and marketing phases.

FROM the pages of our own magazine, *Automatic Control,* I wish to cite a few of many industrial applications of products which are fast increasing the numbers of automatic controls for service or production operations. I will refer to some actual control products, as well as automatic and mass-produced components which make automated phases possible.

The Army Chemical Corps has an automatic poison gas alarm which fairly clarions adaptability to industry. Through foresight, this portable-typewriter size instrument has been designed for mass production. Photocells automatically trigger an audible and visible alarm against infinitesimal amounts of interior or exterior gas. This may offer greater worker, product, and community safeguards.

There is a new x-ray system that takes movies of the innards of running engines. This is great for analysis. It saves time and men in tearing down engines to see what is wrong. There are many safety possibilities for stationary, air-borne or surface transport engines if this is adapted to automatic analysis at the time running equipment displays first symptoms of fault. . . A "kissing cousin" to this is industrial television, which looks into remote and dangerous places to give operators continuous, although remote, contact with operations and reactions. This contributes to safety, greater performance per man and added time to be accounted for by workers.

The railroads have central paneled switching and controls for yards. This saves lives and limbs.

For better efficiency a refinery will use a digital computer on process engineering and operation problems.

There is a lift truck without driver which sets out on its rounds alone, drives itself into a storage section, picks up its load, backs out and delivers.

There is automatic assembly of valves.

Grinding wheels have their proportions mixed automatically through use of computers linked with a punched card system. Thus workers breathe less of this abrasive material.

The Tom Swift book series has been up-dated for the age of automation. A new title is *"Tom Swift and His Giant Robot."*

Automation mass produces pieces and custom-assembles low integral horsepower induction motors in a new factory that is not automatic but approaches it. Completed electric motors are funneled off automated production lines onto rotating turntables. Here they receive automatic running, sound and electrical characteristics tests.

An around-the-clock time interval printer will automatically record on adding machine tape the radioactivity of samples as counted by a scaler.

In many continuous stream processes, analysis for control is automatic and reads out in control houses on graph paper. This eliminates manual sampling and remote laboratory analysis. Such apparatus can be explosion-proof and can be located in hazardous areas.

More than 62 feet of closely-packed panel controls are to be installed in one of the largest steel mills on the eastern seaboard. It will automatically direct uninterrupted operations of bringing skelp from a hot strip mill into an electric weld mill, cutting the skelp to exact length and width desired, forming it from flat sheet into tube form, welding the seam, trimming off the beads, annealing it, conveying the tube through a number of cleaning and inspection stations, and delivering it to a shipping area.

Operating on three conventional flashlight batteries and creating its own breeze, a psychometer checks relative humidity on industrial processing jobs, and automatically takes its own sample.

Computing and recording equipment aids automatic qualitative and quantitative analysis of gases and volatile liquids by partition chromatography.

X-ray thickness and width gages with automatic gage regulators are being used in the steel industry on hot strip mills to monitor the gage and thickness continuously during running. This keeps the workers out of the sweltering heats and employs speeds away beyond human possibilities.

Drilling up to five holes of varying dimensions is simply a matter of pushing buttons with an electronic control system by dialing X and Y coordinates.

A photoelectric analyzer automatically ana-

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lyzes, records and controls chemical processes involving liquids, vapors or gases. Accurate automatic recording over many days, without auxiliary attendance is possible because of unique self-monitoring properties whereby it not only controls a process, but periodically and automatically checks and resets itself.

New York State's radiation safety code is cause for stepped up technical activity in the State Labor Department's Division of Industrial Hygiene. Among hazard controls is introduction into plants of self-recording instruments now available for detection of toxic concentrations of certain chemicals as a means of continuous control by the plant.

FOR authority on the peaceful atom, present and future, I turn to *Chemical and Engineering News*. From its February reporting, several items indicate plenty of problems ahead; and that automatic controls are safeguards as well as production and research necessities. Without automatic controls, this area of progress just wouldn't be.

"Not today, not tomorrow, but 10 years from now the first real impact of peaceful nuclear energy will be felt in our economy and technology. The influence of the peaceful atom will become a major factor in our civilization by 1980. These are predictions contained in a 900-page report to the Joint Congressional Committee on Atomic Energy issued by a panel, after 10 months' work, on the impact of the peaceful uses of atomic energy." It can be obtained through the Superintendent of Documents in Washington.

"One popular myth, that of awakening tomorrow morning in a push-button atomic wonderland, is thoroughly exploded by the panel members. They point out in the report that we are only in the preliminary stages of the coming industrial atomic age. At the present time, application of the peaceful atom to the chemical industry is principally in the use of radioactive isotopes.

"Looking into the future, the panel members envision a chemical plant as a highly integrated complex in which endothermic reactions proceed with nuclear heat, perhaps catalyzed by nuclear radiations. By-product power for operating the plant's equipment would be derived from the nuclear-fired steam boilers, and fission products would be recovered for sale. Process control would be effected by tracers or other radioactive means. When radioactivity has done all it can do in the plant, the gross fission products could be put to further use as sources of heat."

One of our own Research Departments has prepared considerable material concerned with atomic energy. It, too, suggests problems which involve prevention, environment and treatment .... further emphasizing the needs for automatic controls. A booklet being prepared by this Reinhold Publishing Corporation Research Department will quote the July 30, 1956, editorial written for *Chemical and Engineering News* by Dr. Walter J. Murphy, Editorial Director. In part, he said:

"One way of experiencing a mentally disturbing week end is to read the summary reports on 'The Biological Effects of Atomic Radiation,' prepared by six committees of the National Academy of Sciences. We have been warned that extreme caution should be used in exposing individuals to radiation from x-ray units employed for diagnostic purposes. How much more concerned should we be with respect to the dangers of radiation resulting from large-scale bomb and missile testing and the possible dangers that can be associated with widespread development of atomic power reactors?"

THE FOLLOWING are not at all improbable situations which can arise from rapidly developing time and labor savings and safer environments being created by automatic controls and automation. Your understanding and professional knowledge will place you in the position of expert advisers to management, who, at first, may not be any more receptive to these innovations than they were to the coffee break; but who quickly develop an insight to the economic values. They are:

The four-day week at high pay.

Recreational facilities for plant and office workers to be used nights, week ends, *and* during working hours.

Organized sports or body-conditioning exercise activities for plant and office workers during and beyond the work day.

Recognition of on-the-job study and training needs for employees to advance themselves to more responsible, more skilled, more demanding positions that impose greater mental strains.

Recognition that mentally up-graded employees and automatic machines are replacing costly, physical injuries with psychiatric problems. These grow from monotonous or repetitive operations, from free time both in and out of the plant or office, and from greater responsibilities for plant operations, which, through failure at one station can ruin plant outputs costing multiple thousands of dollars, and create periods of downtime for total plants and fellow employees.

Recognition that automatic controls and automation, helping men, increase production and lower costs.

That the labor force does not necessarily decrease, but can be absorbed by manufacturers of new products made possible by automatic controls and high speed, automatic operations.

That men work on jobs which never existed before, because the product, production facilities and equipment are entirely new.

That volume production has an insatiable appetite for parts and materials which can only be

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satisfied when men and machines mass produce them.

That holding the individual worker's wage commensurate with current needs retains his buying power and therefore keeps the cycle fueled with demand.

That environment and counsel range up to the executive class as up-grading becomes more prevalent, workers increase their areas of responsibilities, and managers gain greater understanding of the importance of effective environments.

So it seems that automatic controls and automation, instead of increasing concern with protections against hazards and attentions to physical hurts, tend to help create safer industrial environments.

Occupational Stress and Emotional Illness

OVERWORK is so frequently named as a cause of mental and physical illness that the author made a survey of 91 patients referred for psychiatric consultation. Fifty-four were referred privately and 37 were employees of a large industrial organization. Difficulties in 84 patients were not directly related to their work itself, but to conflict with fellow employees, an illness in a co-worker with the same type of job, or a pre-existing state of tension which made the patient assume an undue load of responsibilities and obligations. Nine were typical cases of conversion hysteria occurring after injury sustained while at work. Only seven patients had emotional disturbance directly attributable to their work.

Symptoms in 49 of the patients in the series were the result of conflict with their immediate supervisors. The complaints were similar in certain respects whether the patient was a railroad section hand or a minor vice-president of a national concern.

Members of this group were described diagnostically as having an anxiety reaction, and they showed certain similarities in response and behavior. None related his symptoms to the interpersonal conflict in his work, but usually the history would disclose that the trouble began when the organization hired a new supervisor at any level whose idea of the way to obtain production was constantly to demand and never to praise. The patients were conscientious and acutely aware of their responsibilities in their work and to their families. They were reluctant to argue or overtly express their hostility or anger, and were inclined to remain in the present jobs rather than face the insecurity and different routine involved in getting work elsewhere.

Since these people did not will the symptoms on themselves they could not end them voluntarily; neither could they accept the normal findings on physical examination nor the suggestion that they stop worrying. The symptoms of fatigue, irritability and subjectiveness were blamed on "overwork," but rest did not bring improvement to most. The few who derived some benefit from a vacation or sick leave had a recurrence of symptoms after they returned to their work.

Eighteen patients had an anxiety reaction occurring after serious or fatal illness in another employee engaged in similar work. These were afforded some relief by their physician's assurance that they were physically fit, but the frequent advice to "slow down a little" further implicated their work in their minds, and they would often give up cigarettes and coffee whether they were advised to or not.

In eight patients, the demands on their time and the many responsibilities required by their work seemed to justify their claim that work was the cause of the tension. Yet, after histories had been taken, it became obvious that a pre-existing tension was producing the occupational demands, rather than work causing the tension. Their histories also revealed several points of resemblance, and gave the typical picture of the person who is willing to trust only his own judgment and is unable to delegate authority or responsibility with ease.

The seven patients in whom the emotional problems were the direct result of their occupations were employees of a large railroad, and their jobs had entailed either the operation or maintenance of steam locomotives for an average period of 13 years before the onset of their symptoms. Conversion from steam to diesel power created problems of adjustment for these men, and they found it most difficult to acquire confidence in their ability to handle the new equipment. Anxiety, tension, and lack of confidence in themselves resulted in somatic complaints, and only after physical examination at the hospital failed to show a physical basis for their symptoms did they discuss the apprehensiveness growing out of their new responsibilities. They had not previously associated their occupational problems with their symptoms.

Nine patients had characteristic symptoms which they attributed solely to injury incurred on their jobs. Those who had been severely injured had functional loss confined to the site of injury, while those with minimal or no demonstrable physical injury often had diffuse and incapacitating complaints. A check of their medical records showed a tendency for the complaint to change and become more appropriate anatomically with repeated examination and questioning. Smith stresses the advisability of always considering the suggestibility of such patients. In his series, although injury was the precipitating factor, the degree of functional disability depended on the personality of the patient.

In this series it is evident that the presumption that the work itself was responsible for the emotional disturbance was unwarranted. Although the state of tension had existed over long periods, none of the patients became physically ill.

What's New, 1956, No. 197, from an article by J. A. SMITH in *J.A.M.A.*, 161:1038 (July 14) 1956.

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Adventures in Avocation

I.

Surgeon—Composer

AN AUTHOR of our acquaintance dedicated his *magnum opus* to "the poet in every man — for such there is." Emerson and others have expressed the same sentiment. All use the word "poet" in more than literal sense. They make it symbolic of the inner urge toward being creative — toward participating in the manifest realization of things transcending the ordinary. Their "'poet" means artist, author, musician, sculptor, architect, dramatist — even dreamer, when dreams enlarge the vistas of the ministry of culture.

These authors are wise observers, for the "poet in every man" implies more than the full savoring of a career by the few; it allows for the many the tang and piquancy of sharing in the happiness of expression — each according to the nature of his gifts and the quality of his talents.

The career "poet" lives his endowments; the "poet" who adds the grace of "poetry" to the pursuit of business or profession, embellishes his life in the idiom of his bestowal. Not only does his "poem" — in art, music, drama, design — enhance the richness and color of his leisure, it sharpens the excellence and deepens the fullness of his vocational dedication. It is the breath of the spirit upon the body of the day.

We acclaim a "poet" — one of our own — a distinguished industrial physician and surgeon whose "poetry" is beautiful music. — EDITOR.

THE RUSTLINGS and small noises of people finding their seats had become subdued; the audience was quiet; the concert was about to begin. A man, glancing at his program, turned to his companion: "Handel, Dvorak, Mozart, Williams, Weber! Who's Williams?" "I don't know," she replied. "But he must be somebody! Look at the company he's in!" After a while the concert was over, and it was clear to all who had heard the première of "Father Abraham" that, among the composers of enduring music, this man Williams was somebody indeed. His work had beauty, scope, depth; it was eloquent, solemn, impressive. Even Weber's sprightly "Invitation to the Dance," the closing selection, seemed unable to lift the somber mood that followed its instrumental vignette of the last hours in the life of the Great Emancipator. The failing heart beats, and the chimes that tolled their end, stayed strong in recollection.

FATHER ABRAHAM" is an orchestral suite in seven sections — a programmatic treatment of episodes, and influences, in Lincoln's life.

The first section, "Hodgenville, Kentucky, February 12, 1809," begins with "a new boy down t' Tom Lincoln's." The opening moments — in D minor — set the stage; indicate the sad, tragic, cataclysmic, portended in his future.

The second section, "Banjo and Bones," epitomizes Lincoln's preferences in music. His were simple tastes — the brass band, and the hoedown — and he was fond of the sad and lugubrious.

In section three, "Lament of the Auction Block," are heard — as Lincoln heard them — the misery, pathos, hopes, and prayers of the human beings sold into slavery, voicing their longings in the hymn and the spiritual.

Section four, "Ann Rutledge," ignores the iconoclasts; the bassoon and the oboe interpret

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the conventional love story — broken by brassy Death. Soft strings attempt to ease the pangs of separation.

Then come the war, and "Damyank — Johnny Reb," and the call to arms amid the winds of winter — while through the shouts of hate and imprecation, and the fumblings of misunderstanding and inefficiency, the quasi-religious "Battle Hymn of the Republic" is pitted against "the implacable, saucy challenge of 'Dixie.'"

Section six is "Ford's Theater, Good Friday Night, 1865." There is victory, peace; and the pit orchestra plays "Hail to the Chief" as the President appears. The then-currently popular waltz that follows is interrupted by the second "shot heard 'round the world," and panic and confusion seethe throughout the night. "The noble heartbeat ebbs, falters, fails," and shortly past 7:00 the next morning ceases forever.

"'Now He Belongs to the Ages" — section seven — describes its subject in a major key. "The sibilant sounds of the train, the funeral cortege, the chorale of mourning, praiseful voices, the solemn tread of thousands of feet — all are heard as Abraham Lincoln joins his fathers — sad, majestic, triumphant, immortal."

THIS first complete performance of "Father Abraham" was given by the Topeka Civic Symphony, at Hoehner Auditorium, Topeka, Kansas, January 25, 1956, under the baton of Everett Fetter. Among the critics' comments: "The work, sincere and often noble . . . . was applauded by the appreciative audience" (*Topeka Daily Capital*, January 26, 1956); "There was a big wave of applause . . . . We were particularly impressed by the doctor's judgment and skill in expressing a mood, the feel of destiny and great things to come . . . . The composition deserves a place of honor in the native American musical literature" (*Kansas City Star*, January 29, 1956).

COMPOSER Vincent T. Williams is a Kansas City surgeon, distinguished in his profession, eminent in its practice. He is a Fellow of the American College of Surgeons, and of the International College of Surgeons; a Diplomate of the American Board of Surgery; Chief Surgeon at General Hospital and St. Joseph's Hospital, Kansas City; and a member of the teaching staff at the University of Kansas School of Medicine.

As Medical Director and Chief Surgeon for a number of companies, mostly in heavy industries, he has an extensive industrial medical practice.

He has long been a Fellow of the Industrial Medical Association; and he was a prime mover in the organization and development of the IMA Component group that is now the Kansas City Industrial Medical Association. At present he is a member of the IMA Board of Directors.

In his professional life Dr. Williams is a thorough disciplinary, dynamic in his views, forceful in expressing them. It has been said of him that, in addition to beautiful music, he writes "strong prose." For some years he served as Editor of *Missouri Medicine* and the *Missouri State Medical Journal*, and he still edits the *Jackson County Medical Society Bulletin* and the *Kansas City Medical Journal*. He is a Past-President of the American Medical Writers' Association. In his personal life, in "the articles of faith" he is a Methodist.

DR. WILLIAMS was born at Stanberry, Missouri, in 1903, the son of the small town's newspaper publisher. His talent for music showed itself early, and was encouraged in a home atmosphere where the rhythmical structure of language had a cultural emphasis that was to prove important in his future. His piano lessons began at the age of six, and it is remembered by his neighbors that "he would get up at the crack of dawn to practice," and thereafter his playing would "continue endlessly." By the time he was ready for medical school he was an accomplished musician.

Here let the *Washington University Alumni Bulletin* (25:5, 4 (May) 1956) take over:

"Though he began his serious composing just four years ago, 'Ted' Williams, energetic and enterprising student in the School of Medicine about 1924, was even then attracting the attention of musicians. Playing his way through medical school as a pianist with the Benjamin L. Rader Orchestra, he was kept busy from October through June. 'He'd play most engagements with us, and every night, from 6:00 to 8:00, dinner music — and Sunday's concert — at the Missouri Athletic Club,' Rader recalls. 'On Saturday nights we'd play at the MAA for dancing from 6:00 to 1:00. Very talented fellow! He'd arrange, write scores for the orchestra, play piano! Wonderful pianist!' In addition to the dance jobs, hotel engagements and parties he played, the young man was keeping up his scholastic studies with apparent ease.

"Oliver Shattinger, St. Louis music publisher, was also watching young Williams, and reports that four of the five Quadrangle Shows written by Williams, 1924-1928, with lyrics by the late Carleton Hadley, are in his music catalogue today. Shattinger found 'Ted' to be 'exceedingly talented . . . . wrote shows, though he hadn't studied instrumentation. He had to orchestrate the whole show. He'd buy a book or two, read them, and that was it!'

"Hadley, who was studying to be an attorney at the time, and Williams collaborated on several shows which even today are selling to colleges and universities in the United States and Canada. Classifying them as 'modern type shows like

'South Pacific" or "Rio Rita,"' Shattinger reports that the Williams' shows, 'Ship Ahoy,' 'Look Who's Here,' 'Way Out West,' and 'Love Goes South' are still in demand. All but 'Love Goes South,' which was written a year after 'Ted' and Hadley graduated, played to capacity audiences at the American Theatre. The old *St. Louis Times*, covering the first performance of 'Ship Ahoy' — described as a rollicking musical comedy in three acts — reported, 'The composer shows an unmistakable gift for melody, and we don't mind saying that no musical show here this season has had as many good tunes as this one.' The four shows, all steady sellers in the Shattinger catalogue, are still receiving critics' approval. As one eastern director stated, 'It is my opinion that these Williams-Hadley shows are the best on the market.'

" 'Ted' Williams was working with illustrious company in those college days. Some of his leading stars in the Quad shows at the old American included Kitty Fink, class of '32, known today as Kay Thompson; Melvin Macginn, '28, now the well-known radio performer Peter Grieg. Clark Clifford, L.L.B. '28, campus leader then, now a distinguished lawyer in the nation's capitol, was also an active participant in the musical productions and a favorite with the audience. Even prior to these medical school days, 'Ted' was earning his academic keep in Kansas City by doing dance band work and special arrangements for Hollywoodite Lewis Forbes, then known as Lewis Forbstein. Studying days at the Kansas City Junior College, he worked nights on orchestra dates. Summers would find him with the tent shows, playing the piano in the orchestra, the trombone in the band."

AFTER graduation from Washington University School of Medicine in 1928, Dr. Williams interned at Missouri Baptist Hospital, St. Louis, 1928-29, and Misericordia Hospital, New York City, 1929-30. Then he returned to Kansas City, and devoted his time and abilities to the general practice of surgery — with results well known. Meanwhile his musical talent was ripening in its latency; seasoning with the years. Its resurgence of expression sought the serious; and in 1951 his first serious composition, "Piano Suite," was presented at a Kansas City concert. This was followed by "Violin Sonata," in 1953, and "Piano Concerto" in 1954; and after these came "Valse Triste"; a musical setting for "Ann Rutledge," the poem by Edgar Lee Masters; and a choral treatment of "The Lord's Prayer." Some of these, notably the "Violin Sonata," have been performed several times. In an interlude of return to the lighter vein—and "in collaboration with Bill Vaughan, BSJ '36" — Dr. Williams wrote the University Club's annual musicale, "The Nit Wits," which was produced in Kansas City.

His first lengthy symphony, "Corn and Counterpoint," a Midwest hoe-down, had its première with the Kansas City Philharmonic in February, 1955. "Humorous and fun-pokin' " — written for a "pop" audience, "square dancers and long-hairs alike" — its performance was well received.

Beginning in 1950, however, a musical biography of Abraham Lincoln had been slowly taking shape in his mind. He was a great admirer of Lincoln, and an ardent searcher into the events of his career. The study of the great man's life and times was almost a hobby; and gradually the memorable vignettes began to assume a musical significance — "his humble birth; his turbulent, sorrowful childhood; the incubus of illegitimacy; the early death of his mother and stepmother; his implacable, bitter hatred of slavery; Ann Rutledge's death; Civil War; the death of his children; his pleasure in simple things; his rapport with the giants of literature." To dramatize these symphonically in worthy phrase was an ambitious undertaking. Dr. Williams therefore returned to the study of formal composition with Dr. Francis Buebendorf, at the Kansas City Conservatory. With encouragement from several critic-composers, he completed "Father Abraham," in time for the January, 1956, date with the Topeka Civic Symphony.

THIS MAN Williams is energetic, dynamic, occasionally almost brusque in manner, but he is keenly appreciative of all that is beautiful, and finely sensitive to the best in people. He has the qualities that go with superior endowments. Sometimes it may be thought that he plays these down a little, but back of his demeanor one senses an innate modesty that may be akin to shyness. He works consistently at his composition; spare time to him means always a few more moments to jot down a strain that has been singing itself in his mind. As a surgeon he will go on in continued and successful dedication to his work. As a composer — especially of music that is essentially American — he may scale the heights. Already it has been said of him that he "seems destined to rank highly with such part-time composers as Alexander Borodin, Russian classicist — chemist and doctor; John Alden Carpenter, of jazz fame — Chicago businessman; and Charles Ives, modern composer — insurance man. Whichever area of music or medicine Dr. Vincent 'Ted' Williams chooses to pursue is bound to be successful, for, in the words of St. Louis music publisher Oliver Shattinger, 'He's just talented in anything he does.' "

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Industrial Medical Association

President's Page

AS I WRITE this I find it difficult to realize that another holiday season has come and gone, and that, before these words are in print, the new year it ushered in will have been a month diminished. But the sense of easing tensions and the spirit of good-will are not yet entirely in the past, and the new year is still almost wholly in the future; and so a little of the reflection that is customary at the holiday period may not be out of place.

Each turning of the calendar marks a fresh beginning. We look back to see how far we have come, take reckonings on where we are, check up our inventories, analyze our situations — and then open our book to the bright page of the new and better that we hope and expect to do, or make, or get, or have, or give, in the days ahead. And at the beginning of the next new year we'll do this again — and it will appear then, too, that not all we hoped and expected will have been realized, but that most will have been tried and much will have been accomplished. There will have been progress; we shall have gone forward. . . .

WE LOOK now to the significance of 1957 in the history of our Association. All of us — Officers, Directors, Committees, Fellows, Members — want it to be our most important and fruitful year. We are not setting out so much to make, or break, records as to advance still further the aims and objectives of our organization and strengthen and enhance its usefulness to the field it serves, the profession it represents, and the national economy of which it is such a vital part. Many brilliant and dedicated men are contributing freely and unstintingly of their time and abilities to the realization of our purposes. Already their work has had a profound effect on the quality and disciplines of industrial medical practice. This work will continue in 1957 — adapting itself to the many new and complex problems that, even this early, have begun to crowd the year. . . .

IN ITS transition from one year to the next, the holiday season itself points up a most persistent problem. An elderly colleague of mine used to say: "There is so little time." I know now that he meant "so little time to do the things that need to be done, and the things we want to do." Each year makes us more conscious of the pressures of mounting heaps of duties and desires that have to be fitted into the shrinking and swift-passing measures of the jet-propelled hours. Time-saving and "time-making" began, I suppose, when men first learned to convey ideas by speech, and then by written words. It went on when the horse was domesticated for riding and the ox for work. And it still goes on, at an ever-increasing pace, in the development of today's methods of almost instantaneous communication; in faster cars, and trains, and planes; in wider use of power as a substitute for hands; in automation, and the marvels of electronic applications. This faster pace, however, this age of speed-packed living, with its legion of added urgencies, exacts its human toll — in traffic accidents, stress reactions, overtaxed hearts, new and strange exposures, and the many others of those "whips and scorns" of too-intensive-time with which physicians in industry already are familiar.

BUT as time becomes more precious, we are learning to use it more effectively. And 1957, more than any previous year, holds promise of helping us to do just that. The instrumentalities of acceleration are evolving — along with themselves — their own means not only of keeping up with them, but also of preventing and mitigating their effects. As the organization dedicated to that purpose, and as its individual members equally so dedicated, we shall use these means to their proper and effective end. We have the ability; somehow, we shall find the time. We look forward, therefore, to a significant and successful 1957. May it be so.

E. S. Jones M.D.

Association News

Twelfth International Congress

THE Permanent International Committee on Industrial Medicine entrusted Finland with the organization of the 1957 Congress. The Organizing Committee, set up by the Finnish government, now announces that the Twelfth International Congress on Occupational Health will be held in Helsinki on July 1-6, 1957. The Committee hopes that the Congress will receive the cordial support and attendance of doctors; engineers; chemists interested in occupational medicine and hygiene; research workers and teachers in this field; social insurance workers; industrial and public health nurses; and others. The International Social Security Association will assist in the preparation of the reports concerned with the social aspects of occupational health. Further information relating to the Congress may be had on application to the Organizing Committee, c/o Tyoterveyslaitos, Haartmaninkatu 1, Helsinki-Toolo. Chairman DR. LEO NORO and Secretary-General DR. PERTTI SUMARI.

Letters

Morning is For the Birds

TO THE EDITOR: Apropos of your editorial, "Observations Matutinal," some of your readers might be willing to pursue some variations on the same subject:

We who dislike mornings are much misunderstood people. We suffer unjust criticism from the early risers. We are accused of being lazy and preferring sleep to work. We are no fonder of sleep than the early birds. It merely takes us longer because we sleep slow. We prefer this explanation to the belief that we are slow to awaken.

Late morning sleepers have what is called the "evening disposition." We appreciate the glories of night, and the later it grows the more we enjoy physical activity, and the sharper becomes our wit. We are joyous creatures who revel in chatter, banter and discussion, except in the morning when any conversation causes anguish almost to the point of pain. Nothing distresses the really accomplished morning sleeper as much as the introduction of any note of cheerfulness before he is well awake. It is a discordant note in a symphony of melancholy. I am proud to say that we are tolerant and charitable toward the early risers who have the "morning disposition." We do not criticize them for their ability to wake up singing, whistling, or even—perish the thought—smiling. We just think they are insufferably obnoxious. More musical by far we find the rasping of a file at midnight than the tinkle of gay laughter at 7:53 A.M.

If our silence does not suppress intruding conversation, if our monosyllables do not quench the gregarious, we have no recourse left but to assert ourselves by an abrupt roar. This has probably given rise to the myth that we are cranky and irritable in the morning. This is not so. All we want from those who surround us is silence, "and not too much of that." We have our own twilight when we are trying to cross the threshold from the world of dreams we are leaving behind while we slowly don our armour to face the realities of the day. We suffer a feeling akin to fear, which lasts with each of us until our own individual signal sounds, acclaiming we are alert and ready to battle the day. It may be the second cup of coffee. It may be the third cigarette, or it may be the swinging open of the office door. Then bring us your troubles, big or little. Before that time we can not focus on trivia; problems of reality.

We repeat, we are not cranky. We do not scold the sparrow for chirping nor the thrush for singing. They are not inconsiderate enough to expect an answer. Few early risers realize the Herculean effort of human courtesy required for us to answer a domestic question even with a grunt.

The problem has, of course, another side. From the fall of darkness on, we late sleepers do have to endure the droopy eyes and stifled yawns of our erstwhile gay companions of the morning. But let us give them credit, they are at least washed, shaved or powdered, as the case may be; their hair has been brushed and they are fully dressed. Not so, the morning parade of unwilling risers. Puffy-eyed and bleary, unkempt and dishevelled, we present faces that are best buried behind the unsocial morning newspaper.

We have observed a frequent phenomenon in marriage, the contriving of Fate to match a man with an evening disposition to a woman with a morning disposition, or vice versa. This situation is not hopeless. In fact it was met extremely well by one couple of my acquaintance. Their formula was so successful that

"I'm not grouchy. I just can't think of anything nice to say."

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I used their home as a model to which I escorted many of those with a similar problem who sought my counsel.

Years of experience had taught the wife with the morning disposition to bring up for discussion no domestic complaint until noon. He, in turn, had learned to confront his wife with no subject of serious conversation after 6:00 in the evening. Since he commuted and was not home for lunch, nor back for dinner before 6:30, all problems were held till Saturday noon, or for the commercials on Sunday television shows. This worked well for years, until a leak developed in the gas tank of the family car and was discovered by the wife on a Monday afternoon.

Had the gasoline begun to leak on Friday, or even Thursday, authorities believe the fumes would not have reached the pilot light of the furnace located in the garage before late Saturday afternoon, by which time my friend the husband would have been informed of it. The explosion which occurred that Thursday midnight not only left a gap in the social life of the neighborhood but has left me without my demonstration family. —CHRISTOPHER LEGGO, M.D.

Medical Librarians

TO THE EDITOR: Recently I had the opportunity of speaking at the Second International Congress on Medical Records in Washington, D.C., and the portion of the program with which I was concerned related to the utilization of statistical records in industrial medicine. Following this meeting, several inquiries were received from Medical Records Librarians interested in learning of possible positions in Industrial Medical Departments. I would be most happy to send to these persons, the names of those interested in having trained personnel either establish complete medical records systems, or maintain them in a Medical Department of sufficient size to warrant this. The interest in the utilization of such professional persons in a Medical Department in industry was explained, and seemed to offer new areas of challenge for those librarians ordinarily at work in hospitals. If anyone wishes to contact a Medical Records Librarian directly, I would be happy to forward the names and addresses of those who have been in touch with me.

—JEAN S. FELTON, M.D.

Western Activities

TO THE EDITOR: The Industrial Section of the Los Angeles County Medical Association is largely composed of Western Industrial Medical Association, or IMA members, and it affords an opportunity for the Western Industrial Medical Association members to meet more frequently; which we do once a month, putting on an appropriate program of interest regarding industrial medical problems. In the past year we have also had several combined meetings, one with the Industrial Nurses' Section, and another with the Industrial Hygienists and the General Practitioners.

Each year at Christmas, we hold a stag party for the doctors of the Industrial Section, and at this time the newly elected officers are formally presented, and the retiring officers sing their "swan song." It has always been a congenial and happy affair. I enclose a group picture which you might wish to use. In the center is Santa Claus, who is no other than DR. CLARENCE LLOYD. At his feet is the garbage can full of Christmas presents for the group. The can was a gift to DR. LLOYD. To his right is DR. MCNEIL, the oldest living actively practicing charter member of the organization — age 76. Another charter member is on the extreme right, DR. PACKARD THURBER, SR. To DR. LLOYD'S left is AVON REMINGTON, the incoming President of the Industrial Section. The row up above — from left to right — DR. ZAIK, retiring President; DR. KIRCHNER, Treasurer; DR. YAMSHON, Secretary; DR. MCKINNON, President of the Western Industrial Medical Association; DR. NESSON, retiring Secretary and incoming Vice-President of the Industrial Section.

—EDWARD J. ZAIK, M.D.

Books

CO in Blood

A SCREENING SEMI-QUANTITATIVE METHOD FOR THE DETERMINATION OF CARBON MONOXIDE IN BLOOD: Jack Mayer, Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C., April, 1956, pp 20, 75 cents.

At the present time, numerous investigations are being directed to a reappraisal of the nature and extent and frequency of carbon monoxide poisoning. There is apprehension that some traffic accidents are related to the damaging influence of carbon monoxide in concentration heretofore regarded as unimportant. One single step in this general enterprise is this report on a screening method for the determination of carbon monoxide in blood.

Cecil K. Drinker

THE FOLLOWING is from *Harvard University Gazette*, November 3, 1956:

At the meeting of the Faculty of Medicine on October 5, 1956, and at the meeting of the Faculty of Public Health on October 24, 1956, the following minute was placed upon the records:

CECIL KENT DRINKER, former Professor of Physiology and Dean of the Harvard School of Public Health, died in retirement at Falmouth, Massachusetts, on April 14, 1956, early in his seventieth year.

Less than a year before his death, Dr. Drinker was honored at the unveiling of his portrait in the Bowditch Library of the Harvard Medical School; on this occasion he was able to greet many of the friends and associates of his long and vigorous career at Harvard. The portrait hangs beside that of Professor Walter B. Cannon, which is fitting since there was little doubt that among his wide interests and accomplishments, physiology held first place in his devotion.

Dr. Drinker was born in Philadelphia, March 17, 1887, of a Quaker family which could trace its forebears to the early settlement of Philadelphia. When he was four years old, the family moved from Philadelphia to Haverford, Pennsylvania, where they lived on the Haverford College grounds for some 13 years.

After completing undergraduate work at Haverford in 1908, Drinker entered medical school at the University of Pennsylvania. He was rated first in his class throughout medical school and received the M.D. degree in 1913. Illness during this period was to make him ineligible for active service in two subsequent wars.

Following graduation, Drinker worked for eight months in Professor A. N. Richard's laboratory at the University of Pennsylvania, then joined the medical house staff at the newly established Peter Bent Brigham Hospital. The 14-months' residency there was intensely stimulating and contributed much to Drinker's life-long attraction to clinical applications of physiologic research.

In 1915-16 Drinker was influenced by another great teacher of physiology when he spent a year in Professor W. H. Howell's department at the Johns Hopkins Medical School. In the fall of 1916 he returned to Boston as a member of Professor Cannon's Department of Physiology, and was well prepared for the opportunity which came two months later when Dr. Cannon was called into active military service. Drinker was made Acting Head of the department and, with two student assistants, he was called upon to carry the full load of physiology instruction in the medical school.

Dr. Drinker engaged the responsibility with complete success and was rapidly promoted to Assistant Professor in 1918, Associate Professor in 1919, and to Professor of Physiology at the Harvard School of Public Health in 1923. The last position was held until his retirement in 1948, and during this period he was also Assistant Dean (1924-35) and Dean (1935-42) of the School of Public Health.

In this brief recital, account should be taken of one further event, the sabbatical leave spent in 1926-27 with Professor August Krogh in Copenhagen. This year marked the beginning of his work on lymph and set the pattern for the research which characterized the remainder of his life.

Dr. Drinker was a member of the Royal Danish Academy of Science and Letters. He was awarded an honorary Doctor of Science degree from Haverford College in 1933.

On the occasion of the unveiling of his portrait, several speakers made reference to his life and works. Only a small part of the picture can be recreated here. His great resources of intellect, classical education, energy, originality, and humanity were illustrated in various aspects of his career.

Drinker was a pioneer in industrial medicine in this country. He was among the first to stress the great importance of the respiratory tract as the route of absorption of toxic dusts and fumes. His publications on resuscitation and asphyxia are well known but his other contributions to industrial safety and preventive medicine are less appreciated because much of his work in these fields was never published. His vision was illustrated by his strong support of the establishment of industrial hygiene and applied physiology as disciplines in preventive medicine and public health, and by his role in the formation of the *Journal of Industrial Hygiene and Toxicology*. Cecil, his wife, Katherine, and his brother, Philip, were for many years the editors of this pioneering journal of industrial health.

Drinker's leadership in the field of industrial health was a great source of strength in the formative years of the School of Public Health. Because of the facilities available and with strong encouragement from Drinker, the Navy sent a succession of its ablest research physicians to work under him, and much fundamental research was performed on oxygen poisoning, decompression sickness, and other problems of submarine medicine. Later, during World War II, Drinker became heavily engaged in research for the Armed Forces, with results that were significant additions to knowledge of respiratory physiology.

Drinker's keenest ingenuity and imaginative thought were brought to bear upon problems of the lymphatic system and tissue fluid exchange. His classic experiments and scholarly style are evident in his books and many scientific papers on these subjects. The technical difficulties of collecting lymph from the heart, lungs, and other tissues have repelled many a lesser investigator; Drinker was not only successful himself but was happiest when teaching the techniques to other investigators who visited his laboratory.

At 55, Drinker relinquished the Deanship because of ill health, and at 60 he felt compelled to retire. Characteristically, he built a small laboratory in his home in Brookline and later one in Falmouth, where he applied his ingenuity to photographing the microscopic circulation in the lung of the living frog.

During these years of retirement, he remained abreast of the literature in his field and continued to write, his last major effort bringing up-to-date his own thought-provoking ideas about "The Clinical Physiology of the Lungs." He lectured in physiology courses at the Cornell Medical School and became a consultant to the Naval Medical Research Institute in Bethesda.

These activities, which he continued as long as he was physically able, illustrated again his devotion to teaching and his deep interest in encouraging young men and women in research.

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Examination for Certification in Occupational Medicine

ELSEWHERE in this issue, announcement is made of the forthcoming first examination for Certification in Occupational Medicine for those industrial physicians designated by the American Board of Preventive Medicine as eligible for such examination. This will be staged in St. Louis on April 26, 27 and 28, 1957, partly falling within the period of the National Industrial Health Conference in St. Louis.

The Board has declared 255 industrial physicians, up to this time, as eligible to undertake this examination, and such physicians have been notified of their eligibility. A larger group of physicians is, as of now, ineligible, but, for many, this ineligibility chiefly relates to insufficient time devoted to this specialty field so that, in time, many of the presently ineligible ones will become eligible.

Some physicians now eligible may believe that this forthcoming examination is the only one in which they may undertake to fulfill the requirements. This is not true. At other times and places, probably at yearly intervals, other examinations will be conducted. Not necessarily will failure to pass one examination preclude subsequent undertaking. Many physicians declared eligible had hoped for intensive special training courses prior to the first examination. Such courses will be offered in one or more geographic areas at a later date but probably none before the St. Louis examination in April.

A questionnaire prepared by a special committee of the American Board, with Dr. Frank Princi as Chairman, will be promulgated by the Council on Industrial Health of the A.M.A. This questionnaire will seek to determine what number of physicians eligible for examination might seek special training, the best suited time, and areas of recognized deficiency. By no means is it mandatory that any one of these courses be pursued in order to take the examination after having been declared eligible to do so.

The examination as conducted will be difficult. Prospectively, industrial physicians will have greater difficulty in that portion of it concerned with general preventive medicine. The areas to be covered have been set forth by the Board as follows:

1. Environmental Medicine: including Microbiology, Biochemistry and Biophysics.

2. Environmental Control: including Community Hygiene, Accident Prevention, Industrial Hygiene, and general background.

3. Epidemiology: including Epidemiological Theory and Methods and the Epidemiology of Specific Disease.

4. Biostatistics: including Theory and Methodology, Analysis, Interpretation of Data, Records, Preparation of Reports.

5. Clinical Preventive Medicine: including Mental Hygiene, Acute Communicable Disease, Chronic Disease, Oral Health, Gerontology.

6. Physiological Hygiene: including Basic Physiology and Applied Physiology, especially dealing with various factors of Stress.

For some degree of preparation for the St. Louis examination, numerous physicians may elect to go about refresher work in their offices and homes. To that end, there are appended two lists of books, one devoted to general preventive medicine, and one to occupational medicine and industrial hygiene.

Hope is high that large numbers of eligible physicians will present themselves before the ex-

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aminers in St. Louis. The even higher hope is that these candidates will achieve success in these tests. Any physician so doing distinctly will have earned his Certification, and, in a measure, this earned Certification should stand out as an achievement no less distinguished than in the case of those constituting the Founders' Group.

Later announcements will provide exact detail as to time and place of the St. Louis examination.

Suggested Reading Lists For Candidates For Specialty Board Examination in Occupational Medicine

St. Louis, April 26, 27, 28, 1957

IN PREPARATION for the examination under the American Board of Preventive Medicine for Certification, some useful purpose may be served by familiarity with the contents of some or all of these listed items. Since examination will embrace general preventive medicine as well as industrial medicine, separate lists have been assembled. These particular lists have not been prepared by the American Board of Preventive Medicine but it is not known that the Board would look with disfavor upon any items included.

I. Industrial Medicine

OCCUPATIONAL Diseases, Clinical:

HUNTER, D.: "The Diseases of Occupations." The English Universities Press, Ltd., London, 1955.

JOHNSTONE, R. T.: "Occupational Medicine and Industrial Hygiene." C. V. Mosby Co., St. Louis, 1948.

HAMILTON, A., and HARDY, H. L.: "Industrial Toxicology." Second Edition, Paul B. Hoeber, Inc., New York, 1949.

FLEMING, A. J., D'ALONZO, C. A., and ZAPP, J. A.: "Modern Occupational Medicine." Lea & Febiger, Philadelphia, 1954.

MEREWETHER, E. R. A.: "Industrial Medicine and Hygiene." F. A. Davis Co., Philadelphia, (Volumes 1, 2, and 3), 1954 and 1956.

INDUSTRIAL Hygiene and Toxicology:

PATTY, F. A.: "Industrial Hygiene and Toxicology." Interscience Publishers, New York (Volume I—1948; Volume II—1949).

BROWNING, E.: "Toxicity of Industrial Organic Solvents." Chemical Publishing Co., New York, 1953.

VON OETTINGEN, W. F.: "Poisoning . . . . A Guide to Clinical Diagnosis and Treatment." Paul B. Hoeber, Inc., New York, 1952.

OCCUPATIONAL Health, Specific Topics:

SCHWARTZ, L., TULIPAN, L., and PECK, S. M.: "Occupational Diseases of the Skin." Lea & Febiger, Philadelphia, 1947.

"Industry and Tropical Health, I and II." The Harvard School of Public Health, Boston, 1951 and 1955.

DRINKER, P., and HATCH, T.: "Industrial Dust." McGraw-Hill Book Co., New York, Second Edition, 1954.

MCCABE, L. C.: "Air Pollution . . . . Proceedings of the U. S. Technical Conference on Air Pollution." McGraw-Hill Book Co., New York, 1952.

VORWALD, A. J.: "Pneumoconiosis, Beryllium, Bauxite Fumes, Compensation." Paul B. Hoeber, Inc., New York, 1950.

OF GENERAL Interest and for Historical Background:

KOBER, G. M., and HAYHURST, E. R.: "Industrial Health." P. Blakiston Son & Co., Philadelphia, 1924.

WRIGHT, W. C.: "De Morbis Artificum" (Diseases of Workers). Bernardino Ramazzini. University of Chicago Press, Chicago, 1940.

WHITE, R. P.: "The Dermatergoses or Occupational Affections of the Skin." Fourth Edition. H. K. Lewis & Co., Ltd., London, 1934.

OLIVER, T.: "Dangerous Trades." John Murray, London, 1902.

MCCREADY, B. W.: "On the Influence of Trades, Professions, and Occupations in the United States in the Production of Disease" (1837). Johns Hopkins Press, Baltimore, 1943.

TECHNICAL Journals in the Field of Occupational Health:

Industrial Medicine and Surgery, 605 N. Michigan Avenue, Chicago 11, Illinois.

A.M.A. Archives of Industrial Health, 535 N. Dearborn St., Chicago 10, Illinois.

British Journal of Industrial Medicine, Tavistock Square, London W.C.1, England.

Transactions of the Association of Industrial Medical Officers, Tavistock Square, London W.C.1, England.

American Industrial Hygiene Association Quarterly, 605 North Michigan Avenue, Chicago 11, Illinois.

Since it may be believed that no candidate is likely to examine all items on this lengthy list, it is indicated that the first five items in the total list above are regarded with favor.

II. General Preventive Medicine

HANLON, J.: "Principles of Public Health Administration." Second Edition, C. V. Mosby Co., St. Louis, 1955.

"Control of Communicable Disease in Man." Eighth Edition. An Official Report of the American Public Health Association, 1790 Broadway, New York, New York, 1955.

American Journal of Public Health. Monthly publication of American Public Health Association, New York.

Public Health Reports. Monthly publication of the U. S. Department of Health, Education and Welfare, Public Health Service, Washington 25, D.C.

"The Public Health Service Today." Revised. U. S. Department of Health, Education and Welfare, Public Health Service, Publication No. 165, U. S. Government Printing Office, Washington, D.C., 1955.

MAXCY, K., (Editor): "(Rosenau) Preventive Medicine and Public Health." Eighth Edition. Appleton-Century-Crofts, New York, 1956.

"Environment and Health." U. S. Department of Health, Education and Welfare, Public Health Serv-

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ice, Publication No. 84, U. S. Government Printing Office, Washington, D.C., 1951.

JOHN HANLON'S text is the most recent edition of a good text on public health administration, although other texts exist that contain out-of-date information and would not be recommended for review unless an individual were aware of the changes that have taken place, especially as they apply to Federal agencies, international health, and the recent developments in the fields of venereal disease, tuberculosis, and medical care.

The second reference is the best reference in the general field of epidemiology and the control of communicable diseases. Easily purchased at 60 cents, it ought to be on everybody's bookshelf.

The *American Journal of Public Health*, a monthly publication, and the Public Health Reports, issued by the U. S. Public Health Service, monthly, contain many articles on recent developments in public health. Persons who wish to be up to date on recent developments would do well to review the last two or three years of these journals.

"The Public Health Service Today" publication can be obtained from the Superintendent of Documents for a small fee, contains a description of the activities of the U. S. Public Health Service, and is easily reviewed.

Maxcy's edition of "Preventive Medicine and Public Health" is primarily a reference book in preventive medicine and is generally not used as a text in public health. It is a large volume and would require long periods of concentrated reading.

"Environment and Health," the last reference, is excellent reading and presents to the physician the reports of sanitation.

A method of review of the general preventive medicine section would be to obtain the publications, "Control of Communicable Diseases in Man," "The Public Health Service Today," "Environment and Health," and review these first; then go to the two monthly publications, *American Journal of Public Health* and *Public Health Reports*, and review in that order; finally, to obtain a copy of Hanlon's text and read those portions of it that have not already been covered in the previous material.

The Family Situation

THE NATURE of marriage in our culture warrants study of its implications for public health. When the nuclear family is the only continuous intimate association, the partners expect more of each other in emotional response. This is one example of potential stress in an age of transition, characterized, according to Kirkpatrick, "by confusion as to the family tradition." He continues: "Tangled ideologies produce family dramas for which the script and roles are not clearly defined. It is no wonder that family tragedies are enacted and that family members suffer confusion, anxiety, and unhappiness." Research studies of marital stress are inconclusive, but they indicate that a substantial proportion of husbands and wives are tense and unhappy in their marriage. Weiss and English, whose monumental survey of psychosomatic medicine includes a wide range of family-related illness, noted that "the advice to marry and have children has been a frequent prescription for certain ailments. But, paradoxical though it may seem, many illnesses arise from the marriage situation, and this fact has not been so clearly appreciated." In two recent population studies in New York City and a rural part of New York State, and in a study of routine admissions to the surgical service of Cincinnati General Hospital, about half of the people examined in each sample showed moderate to severe neurosis. Many outpatient clinics and private physicians report that from half to three-quarters of their patients have symptoms primarily non-organic in origin or have organic pathology which is aggravated by emotional disorder. These studies are cited not to suggest that any known proportion of this well of human misery originates in the family spring but rather to emphasize the need to explore the major human interrelationships that may bear on public health. One of these, though certainly not the only one, is the family situation. As Kirkpatrick says, "The family is the setting for the most intense emotional experiences which the individual has in the course of a lifetime. Birth, puberty, marriage, and death are family experiences. The family is the source of serene security, of anguished insecurity, of love and hate, of pride and shame, of ecstasy and anguish." It is small wonder that the family dramas and crises have a profound effect on the course of health and disease.

—From "Public Health Begins in the Family," by HALBERT L. DUNN, M.D., and MORT GILBERT, in *Public Health Reports*, 71:10 (October) 1956, U.S. Public Health Service.

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